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LIST OF ABBREVIATIONS

Below are listed abbreviations used in bibliography for the names of governmental agencies and other organizations issuing reports.

AAF	ARMY AIR FORCES	JDL	JAHRBUCH DER DEUTSCHEN LUFTFAHRTFORSCHUNG.
AFETO	ARMY FORCES IN THE EUROPEAN THEATER OF OPERATIONS.	NDRC	NATIONAL DEFENSE RESEARCH COMMITTEE.
AFMPAC	ARMY FORCES IN THE MIDDLE PACIFIC	NAVAER	NAVY DEPARTMENT BUREAU OF AERONAUTICS.
AFMTO	ARMY FORCES IN THE MEDITERRANEAN THEATER OF OPERATIONS.	NAVDOCKS	NAVY DEPARTMENT BUREAU OF YARDS AND DOCKS.
AFPAC	ARMY FORCES IN THE PACIFIC.	NAVORD	NAVY DEPARTMENT BUREAU OF ORDNANCE.
AMC	AIR MATERIAL COMMAND.	NAVSHIPS	NAVY DEPARTMENT BUREAU OF SHIPS.
ATI	AIR TECHNICAL INTELLIGENCE.	OPRD	OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT.
ATIC	ARMY TECHNICAL INTELLIGENCE CENTER.	OSRD	OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT.
ATSC	AIR TECHNICAL SERVICE COMMAND.	QMB	QUARTERMASTER BOARD.
BIOS	BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE.	QM	QUARTERMASTER CORPS.
CIOS	COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE.	SCAP	SUPREME COMMANDER FOR THE ALLIED POWERS.
EEIS	ENEMY EQUIPMENT INTELLIGENCE SERVICE.	SHAEF	SUPREME HEADQUARTERS ALLIED EXPEDITIONARY FORCES.
FIAT	FIELD INFORMATION AGENCY, TECHNICAL.	SIG CORPS	SIGNAL CORPS.
		TIIC	TECHNICAL INDUSTRIAL INTELLIGENCE COMMITTEE.
		WPB	WAR PRODUCTION BOARD.

V.2, P. 78. PB 17522. WORKING, HOLBROOK AND OLDS, EDWIN G. MANUAL FOR AN INTRODUCTION TO STATISTICAL METHODS OF QUALITY CONTROL IN INDUSTRY, AN OUTLINE OF A COURSE OF LECTURES AND EXERCISES. APR 1944. 80 P. LIMITED SUPPLY AVAILABLE, PRICE $2.00

The following PB report, abstract of which appears on the page indicated in parentheses, is now available from the Superintendent of Documents at the prices given after each number:

PB NO.	PAGE	PRICE
18873	(V.2, P55)	.10

CHEMICALS AND ALLIED PRODUCTS

Agricultural Chemicals

PB 23167. CLARK, WALTER LEIGHTON, III. A survey of the fungus inhibitive properties of volatile organic compounds. Mar 1946. 75 p. Price: Microfilm-$1.00 - Photostat-$5.00
The work presented is a survey of approximately 350 volatile organic compounds for their fungus inhibitive properties. About 12% were found to be fungicidal and another 15%, fungistatic. The results disclose four compounds that are highly satisfactory as volatile fungicides. These include 2-ethyl-3-propyl acrolein, furfural, ethyl-alpha-chloroacetoacetate, and ethyl thiocyanoacetate. There is, also, presented the biological position and life habits of the fungi, and various measures to prevent damage from the parasitic and saphrophytic types of fungi. The attractive possibilities of volatile fungicides are pointed out as the reason for undertaking this study. A simple and rapid method of assay is included. Tables and photographs appear in the report and a list of compounds and bibliography are appended. The work described was done at the Naval Research Laboratory and was in partial fulfillment for the degree of Master of Science, submitted to Georgetown University.

PB 22284. CUTKOMP, LAURENCE K. Thermal decomposition of DDT dispersed in water. (Minnesota Agricultural Experiment Station. Scientific Journal Series, Paper 2293) 1946. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The present study was carried out to determine whether the loss in toxicity of DDT could be attributed to chemical decomposition or to a physical change of the DDT dispersion in distilled water, and particularly to see if any means could be found whereby DDT dispersions could be sterilized by some modification of the autoclaving procedure. Results show that a DDT dispersion in water heated above 90° C., boiled or autoclaved decomposes chemically. Table, absorption curves, references and foot notes are attached. This work was done at the University of Minnesota.

PB 22282. FAN, H. Y. and RICHARDS, A. G. The temperature coefficients of DDT action in insects. (Minnesota Agricultural Experiment Station. Scientific Journal Series, Paper 2291) n. d. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
As judged by mortality of mosquito and midge larvae, DDT applied externally shows a positive temperature coefficient of action at high concentrations and a negative temperature coefficient of action at low concentrations. The significance of these two opposed temperature coefficients is discussed and shown on the mortality curves for larvae of Aedes aegypti and Chaoborus attached to the typewritten report. This work was done at the University of Minnesota.

PB 20614. JENNETTE, W. V. and KUHN, HARRY A. Destruction of grasshoppers by arsenicals. (Edgewood Arsenal Chemical Div Rept 47). Jan 1921. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Experiments were conducted with various arsenicals to destroy locusts without injury to animals or fowl. Grasshoppers were used in these experiments as locusts were not available. The arsenicals tested were sodium arsenate, sodium arsenite, potassium arsenite, triphenyl arsine, calcium arsenate and calcium arsenite. It was observed that Hopkins Formula (equal parts of sodium hydroxide and arsenious acid in 32 times their volume of boiling water) gave the best results and sodium arsenite the next best. The report also describes the method of preparing and applying the arsenicals.

PB 20637. LEWIS, H. C. and others. A study of the atomization of liquids. (OSRD Rept 6345; Natl Research Council Insect Control Committee Rept 145) Nov 1945. 64 p. Price: Microfilm - $1.00 - Photostat - $5.00
The work described was for the purpose of improving the design and control of exhaust gas venturi atomizers and smoke generators. Data were obtained on the performance of three venturi atomizers of different sizes. The results confirmed the general validity of the equations of Nukiyama and Tanasawa, Japanese investigators, with some modifications to allow for effects caused by the use of hot exhaust gases as the atomizing agent, instead of air at atmospheric temperature, as employed by the Japanese. Tests on eleven commercial liquid spray nozzles yielded information on the degree of atomization produced by various makes of nozzles, when spraying oil. The effects of size of nozzle, liquid properties, and operating pressure on capacity and atomization were also studied. Among the appendices are a bibliography and an account of the mathematics of the equations of Nukiyama and Tanasawa. This is a progress report under contract with the University of Illinois.

Plastics and Plasticizers

PB 23741. ROUNDY, R. H. and HASCHE, R. L. Report on visit to I. G. Farbenindustrie plant at Hoechst/Main. (CIOS File XXVII-17, Item 22) Jun 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains information obtained on the manufacture of solvents and miscellaneous chemicals at the Hoechst-am-Main plant. Also included in the investigation was the polymerization of vinyl acetate to the various types of Mowilith. The Hoechst plant was the largest manufacturer of solvents and related chemicals in Germany. This plant manufactured vinyl acetate by utilizing a vapor phase catalytic process. The catalyst is active charcoal upon which zinc acetate is deposited to give a zinc content of approximately 15%. Glycerol was manufactured by the reduction of hexoses. N-B butyl alcohol was synthesized from acetaldehyde at a maximum capacity of 700 tons per month, or approximately one-quarter of the German production of n-butanol. Crotonaldehyde was produced in a continuous still from aldol with acetic acid as catalyst. The polymers of vinyl acetate produced at Hoechst were known as Mowilith and had molecular weights anywhere from 3500 to 80,000. The various Mowiliths are listed and flow sheets are included which show their preparation.

PB 16340. I. G. FARBENINDUSTRIE. Mischungen aus polyisobutylen und füllstoffen. (Mixtures of polyisobutylene and fillers). (Enlargement print of part of microfilm 182-5). Oct, Nov 1941. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
If polyvinyl methyl ketone is added to mixtures of polyisobutylene and fillers, the resistance of the material will not decrease even if larger amounts are used in order to obtain greater stability. This document is for the purpose of patent application. In German.

PB 16413. I. G. FARBENINDUSTRIE. Stabilisierungsversuche von St III mit ethylamine (Tests for stabilisation of St III with ethylamine). (Enlargement print of part of microfilm 185-3). Oct 1944 - Jun 1944. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00
Handwritten laboratory notebooks on various series of experiments with the cement St III, which is mainly used in connection with Oppanol (polyisobutylene). In German.

PB 16356. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von folien aus füllstoffhaltigem polyisobutylen. (Method for production of film from polyisobutylene which contains fillers). (Enlargement print of part of microfilm 182-5). Jun 1941 - Aug 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The film can be used for anti-corrosive coatings, for lining of vessels and containers, and for caulking of buildings. It is shaped with the aid of an extrusion press, taking care that there is no swelling at the orifice of the roller. Apparently this document was issued as patent 730841 on May 10, 1944 after application as I 69899 XII/39a on June 28, 1941. In German.

PB 16345. I. G. FARBENINDUSTRIE. Verfahren zur polymerisation von isobutylen. (Method for the polymerization of isobutylene). (Enlargement print of part of microfilm 182-4). Oct 1940. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Polymers of high molecular weight are obtained if isobutylene is polymerized at temperatures below -10°C. with the assistance of catalysts used in the Friedel-Crafts reaction, especially boron fluoride. Addition of 0.01 - 0.5% of monovalent aliphatic, cycloaliphatic or aromatic alcohols facilitate the polymerization. This document constitutes patent application I 61 446 IV c/39b (4/02), applied for May 24, 1938, and allowed on Oct 10, 1940. In German.

PB 22809. PRENTICE, T. N. Styroflex, a plastic produced by Norddeutsche Seekabelwerke. (Naval Tech Mission in Europe Tech Rept 277-45) Aug 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a clear transparent plastic known as Styroflex derived from styrene manufactured by the Norddeutsche Seekabelwerke. The physical, chemical, and electrical properties are listed.

PB 28642. ROONEY, J. M. and others. Investigation of German plastics plants - Part 2. (CIOS File XXXIII-23, Items 9, 22) Jun 1945. 307 p. Price: Microfilm-$7.00 - Photostat-$21.00
Part one of this report is PB 949, abstracted on p. 350 of this Bibliography. Part two reports on the investigation of thirteen plants: Dynamit A. G., Troisdorf; I. G. Farbenindustrie, Uerdingen; Dielektra A. G., (Mairowsky & Co.) Porz, near Cologne; Henkel & Cie A. G., Duesseldorf; Lettron Werk Herberts A. G., Wuppertal-Barmen; Bisterfeld & Stolting, Radevormwald, near Wuppertal; I. G., Dormagen; Rheinisch-Westfälischen Kunststoffwerk G.m.b.H., Ketwig, near Essen; Pressewerk A. G., Essen; I. G., Höchst; Chemische Werke Albert, Wiesbaden-Biebrich; Kalle & Co. Aktiengesellschaft, Wiesbaden-Biebrich; Rohm & Haas A. G., Darmstadt. The products and processes at the plants are as follows. Dynamit A. G., Troisdorf: Research Projects: (1) Development of a low-density foamed plastic; (2) development of a polyamide leather substitute; (3) development of a cold-setting phenolic glue; and (4) development of a polyester resin (I Gummi). Foamed plastics have been made with polystyrene, cellulose acetate, polyvinyl chloride, phenolic resin, urea-formaldehyde resin, and polyisocyanates. The foaming agent most generally used is Poropher N which is azodibutyric acid dinitrile. The comparative properties of some of the plastic foams are shown in a table. Polyamide leather substitute: Replacements for leather were critically needed in Germany because of the unavailability of leather. Polyvinyl chloride, polyvinyl alcohol, and polyamides were used to meet this situation. Development work at Troisdorf was concentrated on a polyamide leather substitute. The best leather substitutes were prepared with Igamids B and 6A, plasticized with benzenesulfonethylamide (MMA). Cold setting phenolic glue: A phenolic resin glue was desired for cold assembly work in aircraft construction. It was found that P. 600 resin, made with 100 parts phenol and 180 parts formaldehyde catalyzed with 3 parts sodium hydroxide, could be cured at room temperature with p-toluenesulfonic acid (TW-Härter). The TW hardener is used in the proportions of 1 part to 5 parts P.600. It has a specific gravity of 1.143; 100 grams is equivalent to 88 cc. Polyester Resins (I Gummi): These plastics are rubber-like products made with polybasic acids and polyhydroxy alcohols. They are similar to Paracon resins made in the United States. Adhesives for plastics are listed in a table. A second report on the Dynamit A. G., Troisdorf target describes the processing of polyvinyl chloride and its derivatives including the starting materials, specifications of I. G. polymers used, the Wacker polyvinyl chloride, I. G. polymer for electrical purposes, water resistance of I. G. polyvinyl chloride "Vinnol HH", the applications of Troisdorf PVC products, i. e., soft "Mipolam PCU" (plasticised PVC) for insulation sheathing for electrical cables, waterproof coats and raincoats, and the like, hard "Mipolam PCU" (unplasticised PVC) for use in chemical apparatus, and in brushes and roofing material. A new development called "Luvitherm" is calendered unplasticised PVC film. Its principal use is as tape for a wrapped insulator for electric wire, and also for phonographic reproduction, either as an embossed tape, for use with a sapphire needle, or after coating with magnetic iron oxide, for electromagnetic reproduction. The manufacturing details of hard "Mipolam", soft "Mipolam" and "Luvitherm" are given. The vinyl chloride interpolymers, such as "Igelit MP" and "Astralon", used are listed together with their applications and manufacturing details. Troisdorf also produced cellulose acetate. Process details and manufacture of cellulose acetate moulding powder are described. Other products were vulcanised fiber manufactured by a zinc chloride process and a sulfuric acid process; uses and properties are given. "Godynin", a composite material made from sheets of aluminum alloy and vulcanised fiber was used in aircraft construction, but it was in a developmental experimental stage. In another department of Dynamit A. G., phenolic resins, moulding materials and laminated products were made; including "novolaks" and "resoles". These processes are described. Research was also conducted into the manufacture of small bearings from phenol impregnated canvas. Efforts were made to expand nearly all the plastics but no great success seems to have been attained nor was there any widespread use as far as could be discovered. Additional products were P. 600 adhesive, adhesive varnish P. 1091, cast phenolic resins, "Lignofol" (wood laminated from veneer and thermosetting resins). Dynamit A. G. also had a molding ship. I. G. Farbenindustrie, Uerdingen: The scientific laboratory was concerned with the development of new plasticisers, stabilizers, resins and organic raw materials. The range of products which they investigated is indicated by the list of sixty patents taken out since 1935 which is a part of the appendix to this publication. Alkyd resins for use in the protective coating field were made at Uerdingen under the trade name "Alkydal". These were condensation products of phthalic acid, poly-hydric alcohols and fatty acids. The Uerdingen laboratory is responsible for all quality control and development work on glues for I. G. Farben. Alkydals, phthalic acid-glycerine alkyds modified with oils are produced at Uerdingen. Plasticizer manufacture at Uerdingen was not extensive. The nitro-cellulose plasticisers were definitely wartime castor oil substitutes. Igamid plasticisers were in the experimental stage. The structure of some of these plasticisers is given in the text. Some work had been done on cyanosorbic acid ester polymers, Dielektra A. G., Porz (Rhein) near Cologne: This factory manufactures laminated materials from phenolic resins with paper and fabric. They also cover wire with enamel, cotton and polyvinyl chloride. A preliminary investigation of the production of laminated materials was made. These laminated materials consisted of condenser bushings, bearings for use in rolling mills with hot rolls, rod and "Schaeferfolie". "Schaeferfolie" are bearings which have been used as a substitute for ball bearings. Such bearings were not made by this company. These bearings were made from finely woven hemp impregnated on one side with a phenolic resin. This coated fabric is uniformly pressed and the uncoated side is abraded. It is then cut to size and placed inside the steel ring used as the outer surface of the bearing. The inside surface of this steel ring is roughened and an aluminum rod is fitted so that it holds the fabric in place. The whole assembly is then heated and sufficient pressure is supplied by the greater expansion of the aluminum to bind the hemp to the steel. At the same time the phenolic resin is cured. On cooling, the aluminum rod is removed and the impregnated hemp provides the bearing surface. These bearings were said to have been successfully used on aircraft. A description of the test for degree of cure of phenolic moldings is given. The tube extrusion machines are described. Henkel & Cie, A. G., Duesseldorf: The principal activities of Henkel & Cie are connected with the production of cleansers, scourers and starch-based adhesives. Melamine glues are a minor interest. They do not manufacture urea-formaldehyde glues, or mixed melamine-urea formaldehyde glues. Henkel do not make melamine-formaldehyde molding powders. They have licensed I. G. to operate their patents in this field. I. G. are believed to make some melamine molding powder at Leverkusen. I. G. makes melamine at Mainkur. I. G. has not taken out a license for manufacture of melamine glues: Henkel are the only firm in Germany making these, and they buy this melamine from I. G. The uses and production of these glues are treated. Lettron Werk Herberts A. G., Wuppertal-Barmen: The Barmen factory was in operation producing paints for the railways, and also cable mass for the insulation of power cable joints, in connection with the repair and reconstruction of the electrical power lines in the district. The firm produced plasticisers based on the esterification with

polyalcohols of the lower boiling fatty acids produced in the oxidation of Fischer-Tropsch hydrocarbons. They obtained the acids from the I. G. factory at Witten. Manufacturing details are given. Bisterfeld and Stolting, at Radevormwald, near Wuppertal: A short visit was paid to this factory to obtain details of a new method of testing rate and degree of cure of thermosetting molded samples, and details and photographs of the machine are presented. This small factory was the only independent molding firm in Germany. Besides the Schmidt-Bisterfeld machine for testing cure, information was obtained on the molding machines and a further development for the replacement of bronze liners in steel by a phenolic compound. I. G., Dormagen: This plant manufactured cellulose acetate, cellulose acetobutyrate and cellulose tripropionate. Methods and processes are described. Rheinisch-Westfälisches Kunststoffwerk G.m.b.H.: This molding plant was a department of the Deutsche Eisenwerke A. G., Mülheim Ruhr. This plant used polystyrene, polyvinyl chloride and phenolic molding powder. Presswerk A. G., Essen: This firm specialized in molding bushings and bearing for heavy duty work on industrial machines for approximately 30% of their output. Miscellaneous industrial and electrical parts made up the remainder of their production. I. G. Höchst: Production of monomeric vinyl acetate: Specification for components and plant description is given for synthesis in monomeric plant and distillation plant. Also a short description of the vinyl acetate contact furnace is given. The polymerization of vinyl acetate monomers is described. Flow charts illustrate the process. The manufacture of "Asplit" is described. Asplit is a cement consisting of asplit resin mixed with a mineral filler and hardening agent. Asplit solutions consist of different compositions of phenol, formaldehyde and sodium hydroxide; uses for the different grades are given. A report giving the layout of the apparatus is appended. There is summarized the work of I. G. in the field of fluorine resins. Chemische Werke Albert, Wiesbaden-Biebrich: The products of this plant are as follows: Novolaks, (D. A. and F. H. hars) resole (ammonia free), plywood resole, sonderpressenmasse 3721, (a wood filler impregnator), Albertol resin, 111L resin, Durophene 216V, 306V and 77B, Alresin 142R and 313C and Alnoval K6S. Composition and descriptions of processes for manufacture are given. The Eirich mixer used in this plant is described. Kalle & Co. A. G., Wiesbaden-Biebrich: The following products are made at this factory: (1) Cellophane, plain and moisture proof for wrapping purposes. Cellophane adhesive tape; (2) Cellophane sausage casings; (3) Bottle capsules made from viscose and sold under the trade mark "BIKA"; (4) Bottle capsules made from cellulose acetate and sold under the trade mark "FLAKA"; (5) Water soluble cellulose ethers, such as methyl cellulose and cellulose glycollic acid sold under the trade marks "TYLOSE" in the textile industry as finishing or sizing agents, as emulsifying agents and as addition for washing agents. "GLUTOLIN" and "GLOTOFIX" as binding agents, as adhesive or glue; (6) Light copying paper "OZALID" on base of light-sensitive diazo compounds, gives positive prints while the old blue prints were negatives; (7) "OZAPHAN" film, a copying film for home movies, produced on base of cellophane and azo dyestuffs, not manufactured during the war; (8) Desizing agents (a) "BIOLASE" a bacterial product and (b) "VIVERAL" a product from pancreas; (9) Superpolyamid foil, useful as covering or protective sheets, as a packaging material; (9a) Superpolyamid bands, sold as "SUPRON-BAND"; (10) Artificial wire glass "DICELLA", made by coating wire mesh with a cellulose acetate lacquer. More complete descriptions are given of these products in the publication. Röhm and Haas A. G., Darmstadt: This plant was engaged in the manufacture of methacrylate resins and the forming of plexiglas articles. The material listed in the appendices was obtained chiefly from the research files of Dynamit A. G., Troisdorf, and includes formulae and manufacturing instructions for phenol and urea formaldehyde resins molding materials and laminated products. There is also some information obtained from Dielektra A. G., and I. G. Höchst. Tables and photographs.

PB 22940. TANNER, H. A. German high polymer materials of electronic interest. (Naval Tech Mission in Europe Tech Rept 441-45) Sep 1945. 25 p. Price: Microfilm-50¢ - Photostat-$2.00

This report describes briefly German high-polymer materials applicable to electronic uses in comparison to similar Allied material. The purpose is to determine whether any German developments along this line are sufficiently novel and outstanding to be of immediate value. In general the results are negative in that most of the German materials and processes have been equalled or exceeded by the Allies. Certain German developments, in particular the polyurethane plastics, the vinyl carbazole products, chlorinated polyvinyl chloride, and cellular polyvinyl chloride, may be of value according to the investigator. The preparation of a few of these plastics are described in appendices, while one appendix treats of "The Passage of Electromagnetic Waves through Flat Dielectric Plates". This document will not reproduce well.

Paints, Varnishes and Lacquers

PB 22[illegible]. ACKER, H. L. Investigation of German aircraft protective coatings. (Naval Tech Mission in Europe Tech Rept 366-45) Sep 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00

This report covers research, development, and investigations for improved protective coatings for aluminum, magnesium, steel, fabric, and other aircraft components carried on by the German Air Ministry. The information in this report is based on checking German specifications, examination of aircraft and component parts, interrogation of engineering and production personnel connected with leading aircraft manufactures of German military aircraft, technical personnel from German government laboratories whose function was to control, test, and approve finishing materials, and personnel from other research laboratories on aircraft in Germany not directly connected with protective coatings. The manufacturing plants visited were Blohm & Voss, Messerschmitt, Junkers, Bavarian Motor Works, and Heinkel-Hirth. The laboratories visited were Hamburg, Travemünde, Braunschweig, Goettingen, Munich, Stuttgart, and Berlin. The chemical plants visited furnishing paint materials to the aircraft industries were Gustav Ruth Temperol Werke, Michael Bartel & Co., and Beckacite Kunstharz-Fabrik G.m.b.H. The engineering and production personnel interrogated were from Junkers, Messerschmitt, Doenier, in custody of USSTAF. The pattern for quality of German military aircraft was set up in 1933, with adjustments and improvements up to 1938. Specifications were very rigid and in many respects followed the pattern of U. S. procedure. The steel was of high quality, properly treated and plated before assembly. Alclad and anodising were prime requirements. All surfaces, interior and exterior, required high quality primer and finish coat of an alkyd or phenol base. The quality of these finishes dropped rapidly after 1938 and continued dropping until the end of the war.

Inorganic Chemicals

German

PB 17331. BRETSCHGER, H. E. and others. German hydrogen peroxide industry. Apr 1946. 136 p. Price: Microfilm-$1.50 - Photostat-$10.00

Previous surveys of the German hydrogen peroxide industry by several investigating groups have reported on production quantities, plant location and capacities, ownership, personnel, etc. The properties and military applications of peroxide have also been studied. The purpose of the mission which is the subject of this report was, therefore, not to duplicate the work of others but to obtain additional and more specific information with respect to manufacturing processes, equipment and operating procedures. The primary purpose of the mission was to discover if possible any important process developments which had been accomplished in German practice and which would by their adoption improve the processes being used in this country. For this reason highly concentrated peroxide as well as the production of peroxide of normal grades and concentrations were of

importance. The targets to be visited were selected after due consideration since it was known that three electrolytic processes and one direct chemical process were in use in Germany. Since the chemical or barium peroxide process was insignificant for this mission, emphasis was placed on the electrolytic processes for basic manufacture and to the processes for producing the concentrated product. The targets investigated and the objects of investigation were:

(1) Degussa, at Rheinfelden, Germany
  (a) Production of H_2O_2 by the $H_2S_2O_8$ process.

(2) Elchemie, at Kuefstein, Austria
  (a) Production of H_2O_2 by the $(NH_4)_2S_2O_8$ process.
  (b) Production of concentrated H_2O_2 by the Elchemie method.

(3) Electrochemische Werke, Muenchen, Hollriegelskreuth, Germany.
  (a) Production of H_2O_2 by the $K_2S_2O_8$ process.
  (b) Production of concentrated H_2O_2 by the E.W.M. method.

(4) Otto Schicker Company, Bad Lauterberg.
  (a) Production of H_2O_2 by the $K_2S_2O_8$ process.
  (b) Production of concentrated H_2O_2 by the E.W.M. process as possibly modified for application at this site.

All these processes are used in the United States. Photographs and plans of the various plants and processes illustrate the report.

PB 22949. BROOKS, C. H. and others. Nitric acid manufacture in Germany. (Naval Tech Mission in Europe Tech Rept 487-45) Oct 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

The Knbsen plant of Wissenschaftliche Forschungs-Gesellschaft, a subsidiary of I. G., was investigated. Information on other plants was obtained by interrogation.

PB 20929. DAIMLER. Ueber chemismus und anwendungsmöglichkeiten von "Intravan U". (Chemistry and application of "Intravan U"). (I.G. Farbenindustrie. Zetko report). Apr 1941. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

Intravan is the trade name for a series of five protecting salt mixtures. The additional letter U stands for "unlöslich" (insoluble). Whereas the former products contained water soluble substances such as diammonium phosphate, the new product was prepared as follows: In diammonium phosphate and an excess of conc. ammonia zinc hydroxide was dissolved until saturation. If this solution was applied on wood it dried immediately into a firm, hard glaze which on analysis proved to be a complex compound of the form $Zn_4\text{-}O(NH_3)_3\text{-}(PO_4)_2$. However, other configurations are possible, if more zinc hydroxide is added to the complex solution before the painting. In the manufacture precipitated zinc hydroxide was used the NaCl-content of which was reduced to 1% by not water washing. In German.

PB 22941. ERIKSON, R. E. Treatment of wood for fire resistance. (Naval Tech Mission in Europe Tech Rept 452-45) Sep 1945. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

The Chemische Werke Albert located at Biebrich, Germany, manufactured a compound under the trade name "Flammenschutz Albert" which when dissolved in water and applied by spraying or brushing makes wood fire-resistant. Due to shortages of ingredients, the original formula, which was used as early as 1934, has been changed making use of wartime substitutes. The wartime formula is reported to be less effective. Formulae (largely one of the ammonium phosphates), treatments, and test results are given. Diagram and photographs are included.

PB 22830. GORDLEY, W. G. and MORROW, G. M. Hydrogen peroxide: Preparation, practices and rules of transport and storage. (Naval Tech Mission in Europe Tech Rept 409-45) Sep 1945. 92 p. Price: Microfilm-$1.00 - Photostat-$7.00

The wide military use of hydrogen peroxide in Germany necessitated the construction of a great quantity of storage depots and the wide dissemination of knowledge of this material. Manuals on handling under different conditions were printed, and simplified analytical methods were established. This report attempts to bring together in one report the most recent developments in this field to aid in the possible establishment of similar depots in the United States. Appendices appear at the end of each part, tables are included within the report, and diagrams at the end.

PB 23782. SHERWOOD, T. K. Storage of hydrogen peroxide at Vaas. (CIOS File VII-4, V-38, Item 4) Oct 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

At Les Moriers, near Vaas, southeast of Le Mans, and only 225 km (by air) from London, is a German underground storage of some 80,000 gallons of strong hydrogen peroxide and 5000 - 1000 gallons of winter grade strong permanganate solution. A vertical shaft connects the underground storage to the tops of a hill, where there is a reinforced concrete block 30 feet by 18 feet by 20 feet. The underground storage facilities are completed and stocked but the concrete structure above is incomplete. Presumably this site was intended for the purpose of launching a missile requiring very large quantities of hydrogen peroxide (larger quantities than could reasonably correspond to one V-1 site).

United States

PB 22466. BOND, H. A. and MCGOVERN, J. J. Generator for the use of sodium hydride-aluminum mixture for field generation of hydrogen: Final report. (OSRD Rept 3141) Jan 1944. 35 p. Price: Microfilm-50¢ - Photostat-$3.00

The development of a generator for the use of sodium hydride and aluminum mixture for field generation of hydrogen is described. The chemical for use in this generator is described in OSRD Rept 3142 (PB 22467). The design of a plant for producing 2,000,000 lbs. a year of the chemical is given in OSRD Rept 3063 (PB 22465). About 1,000 lbs. of the chemical were packed in generators and delivered to the Signal Corps, the Weather Bureau, and the Naval Observatory for field trials. Preliminary demonstrations indicate that the chemical and generator are satisfactory for filling 30 gm. and 100 gm. balloons under field conditions. An appendix consisting of instructions, table, diagrams, and photographs is attached. For description of plant given in Rept. 3063 see PB 22465 under Hyland, H. G.; for Final Rept. 3142 see PB 22467 also under Bond, H. A.

PB 22467. BOND, H. A. and DUNNING, J. W. Sodium hydride-aluminum mixtures for field generation of hydrogen: Final report. (OSRD Rept 3142) Jan 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00

A solid mixture containing equal parts by weight of sodium hydride and secondary aluminum has been shown to be satisfactory for generation of hydrogen gas in the field. A successful simple generator has been developed for filling meteorological and other small balloons, operating very much like the generators now used with lithium hydride. This report summarizes the successful process development on a pilot-plant scale, the basis for the design of a plant for the production of sodium hydride mixture (HH-892). The process, engineering, and plant design estimates are presented in OSRD Rept 3063, see PB 22465, under Hyland, H. G. The generator is described in OSRD Rept 3141, see PB 22466, under Bond, H. A. Photographs, tables, and diagrams are attached.

PB 22465. HYLAND, H. G. and HUNTER, C. M. Design of plant for producing sodium hydride-aluminum mixture: Progress report. (OSRD Rept 3063) Dec 1943. 20 p. Price: Microfilm-50¢ - Photostat-$2.00

A mixture of sodium hydride and powdered aluminum was developed as a possible chemical for producing hydrogen in the field for filling meteorological balloons. This report describes the design of a plant for producing 2,000,000 lbs. a year of the mixture. Diagrams are attached. For description of generator, given in Report 3141, see PB 22466 under Bond, H.A.; for final Rept 3142 see PB 22467, also under Bond, H.A.

PB 22481. NATIONAL RESEARCH CORPORATION, BOSTON, MASSACHUSETTS. Report of lithium research, Mar 15, 1943 - Oct 18, 1943. (OSRD Rept 2089) Dec 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes three processes for production of lithium metal by vacuum thermal reduction at a fraction of the present price of metal obtained by the present electrolytic method and also with a smaller capital expenditure for plant construction. These new processes suggest the possibility of using lithium hydride for hydrogen generation in the field in place of the currently used ferrosilicon. Diagrams attached. See also PB 22472.

Ordnance Chemicals

German

PB 23077. COLES, J. S. The use of coal dust as an explosive in unconfined areas. (U.S. Naval Tech Mission in Europe Tech Rept 548-45). Oct 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
The information in this report was obtained in an interview with Dr. Mario Zippermayer and a translation of his own report is attached. Dr. Zippermayer had developed a method of exploding coal dust in unconfined spaces which would generate a powerful low frequency blast over a large area. This blast would be particularly effective against flat surfaces and its use against aircraft in air or on the ground was recommended. Allied occupation of Germany prevented further development.

PB 20411. DYNAMIT A. G., TROISDORF. Verfahren zur herstellung von nitrierungsprodukten von toluol, hauptsächlich trinitrotoluol. (Process for the manufacture nitrates from toluene, particularly of trinitrotoluene). (German patent application D 87836) May 1942. 9 p. (p. 1 missing) Price: Microfilm-50¢ - Photostat-$1.00
One page missing. Not illustrated.

PB 25174. PARKER, R. H. Nipolit. (Halstead Exploiting Centre) n. d. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is a summary of information from the files of the Halstead Exploiting Centre (British) and describes the preparation, properties and uses of Nipolit, a new German high explosive. It is made from waste propellent powder, PETN (pentaerythritol tetranitrate), and nitroglycerine or diethylene glycol dinitrate. The use of powders containing nitroguanidine results in an inferior product. The ingredients are mixed wet, then dried and rolled. The product is a thermoplastic mass with the consistency of smokeless powder. It can be pressed or machined to any shape.

United States

PB 20616. REHRE, C. H. New methods of making chloropicrin, Dec 1919 - Apr 1920. (Edgewood Arsenal Chemical Div Rept 39) Nov 1921. 7 p. Price: Microfilm - 50¢ - Photostat - $1.00
During the experiments the best yield of chloropicrin was obtained by passing chlorine into a mixture of 100 grams picric acid and 1237 grams of lime, (47.2% $Ca(OH)_2$), to saturation, and then distilling. This quantity of lime corresponds to 583 grams of pure calcium hydroxide, the amount theoretically required to produce 1000 grams of 34% bleaching powder, which would be necessary in practice to chlorinate 100 grams of picric acid by the old method. The yield obtained in this case was 79.3% of the theoretical. The use of calcium carbonate (precipitated) and chlorine gave yields of about 70%, sodium carbonate and chlorine yielded 69% of the theory and sodium hydroxide was found to be unsuitable, as were also hot mixtures of lime and picric acid.

PB 20896. BENNETT, H. S. and SPENCER, E. W. Chemical properties of mustard gas. (Edgewood Arsenal Chemical Div Rept 93) Aug 1923. 144 p. Price: Microfilm-$1.50 - Photostat-$10.00
The information in this compendium has been gathered mainly from the Technical Files of the Edgewood Arsenal Library. They include the innumerable references to the use of bleach in the destruction of this gas on the battlefield; futile attempts toward its detection in the atmosphere during gas attacks; and progress reports upon the various phases of investigation, later evaluated and summarized in a more acceptable form. Data are given on the following processes: (1) Pope, 60° C., or Castner-Kellner processes; (2) Levenstein or 30° C. processes; (3) Cleveland distilled process; and (4) French mustard process. Bibliography.

PB 20736. BLAYLOCK, F. R. Hydrolysis of mustard. (Edgewood Arsenal Chemical Div Rept 104) Mar 1922. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
The investigation was undertaken at the request of the Toxicological Laboratory in order to determine whether the vesicant action of mustard might be due to the hydrolysis product intermediate between mustard and thiodiglycol, i. e. hydroxychlorodiethylsulfide ($HOCH_2CH_2SCH_2CH_2Cl$). The isolation of a quantity of the latter product and the testing of its vesicant action was the chief object of the work. The compound itself could not be obtained in the pure state. A solution which was calculated to contain 8.8% was obtained by a freezing method and found to have no vesicant action. Attempts to obtain the intermediate by condensing with mercaptides and phenolates proved fruitless. The investigation was therefore discontinued. The report also discusses briefly the mechanism of the hydrolysis reaction.

PB 20721. BLODGETT, W. A. Preparation of allyldichlorarsine. (Edgewood Arsenal Chemical Div Rept 179) Jun 1922. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
Allyldichloroarsine was prepared by means of a modified Grignard method. This modification consisted in carrying out the process in one step by placing arsenic trioxide, together with metallic magnesium, in anhydrous ether and adding allyl bromide. This procedure permitted the formation of the allyl arsenious oxide before the condensation of magnesium allyl bromide and allyl bromide to form diallyl could take place. Three other methods to form allyldichloroarsine were unsuccessful. The report also describes the preparation of the allyl intermediates. The properties of allyldichloroarsine and the quantitative determinations of the arsenic and chlorine components were described. Bibliography.

PB 20729. BLODGETT, W. A. Preparation of alpha and gamma bromacetoacetic esters. (Edgewood Arsenal Chemical Div Rept 190) Jun 1922. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The alpha and the gamma esters were prepared to discover whether the position of the bromine atom caused any difference in lachrymatory properties. The two forms for these experiments were prepared by brominating ethylacetoacetate. The properties of the two esters were investigated. However, the alpha form was unstable and it was ascertained that the alpha form had been transformed to the gamma form during the test. It was concluded that due to the difficulty of preparation, chemical instability and relative inefficiency these two compounds had no particular value as chemical warfare agents.

PB 30716. BOUDER, E. M. The chemical properties of brombenzylcyanide. (Edgewood Arsenal Chemical Div Rept 173) May 1922. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
This report is one of a series in which an attempt has been made to present in compact form the chemical properties of certain chemical warfare agents to serve as a reference work and guide to the literature for those using or planning the use of these substances. A brief critical evaluation of the experiments and statements reported in the literature is given whenever it seemed desirable. The information in this report on brombenzylcyanide has been gathered from the technical files, from monthly project reports up to and including the month of April 1922 and reports submitted up to May 11, 1942. The report includes the problem of storing brombenzylcyanide, its action on metals, glass or glass-lined equipment, cements, rubber, asbestos, bakelite, lacquers and other substances. The use of the chemical in grenades and shells was under consideration. Physical data were also reported. Bibliography.

PB 18865. BREWER, S. D. Studies on the stability of PETN and pentolite: Progress report, Jun 1944. (OSRD Rept 3983) Aug 1944. 96 p. Price: Microfilm-$1.00 - Photostat-$7.00
The work reported here shows that the stability of pentolite can best be deduced from its rate of gas evolution at 68° C. The stability of pentolite is impaired by the presence of alkali and, to a lesser degree, by acid. The presence of the nitrated by-products of the pentaerythritol synthesis has no detectable effect upon the stability of pentolite. The contamination of pentolite by acid is unlikely as long as the PETN (pentaerythritol tetranitrate) from which it is made is properly stabilized. The presence of alkali in PETN arises from the stabilization process. In the original stabilization process solid sodium carbonate was stirred in the acetone solution of PETN, and water was added later. On the basis of results reported here, the sodium carbonate is now added in the form of a solution. It has been found that if, in the stabilization process, the acetone solution is diluted with one per cent ammonium carbonate solution the best possible pentolite may be made from PETN so stabilized. The 100° C. vacuum stability test fails to show the presence of harmful amounts of alkali in pentolite. The 120° C. vacuum stability test for PETN does not give significant results. The results of this test are determined for the most part by the extent and location of occlusions containing acetone. The occlusion of acetone does not impair the low temperature stability of PETN to any significant extent. Stability data, graphs, photographs and diagrams of the apparatus are included in the report. Appendix III gives corrections to OSRD report 1414, PB 18864, by Russell McGill, also on this subject. This is a progress report under contract with Carnegie Institute of Technology.

PB 20893. BROWN, S. F. Chloroacetophenone container for gas chamber training purposes. (Edgewood Arsenal Chemical Div Rept 90) Feb 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of the investigation was to develop a suitable means of using CN (chloroacetophenone) in a gas chamber for training purposes and to develop a practical container for the CN. The most practical method of using CN for that purpose was in the form of a pellet or a gelatin capsule containing the lachrymator which could be easily and quickly volatilized. A small tin box was recommended as a container. Diagram of pellet former and test data are included.

PB 18880. CARTER, R. C., JR. and others. Mechanism of gelatinization and solution of fibrous nitrocellulose in non-aqueous solvents: Progress report. (OSRD Rept 1385). May 1943. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report presents some interesting data on the mechanism of gelatinization of nitrocellulose. It shows very clearly the not altogether reversible character of the process of solution of nitrocellulose and also indicates a satisfactory method for the separation of nitrocellulose into homogeneous fractions. In order to study the efficiency of the two fractionation processes, observations were made of the relative and specific viscosities of 0.5% solutions of the fractions in pure acetone at 25°C. From these viscosity data it is evident that a real fractionation has been effected by both procedures. It can be now predicted that further studies of diffusion and viscosity behavior will be satisfactory for the characterization of the fractionated dissolved nitrocelluloses so that results of solubility studies may be more significant. Tables and graph of the observed solubility and viscosity are included in report. This is from the University of Wisconsin.

PB 23770. CARVER, E. K. and HOUGHTON, G. Rheological properties of thickened liquids. First report, Jun 5, 1942 - Dec 1, 1942. (OSRD Rept 1113) Dec 1942. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a report of work done under contract with the Eastman Kodak Company to define and measure rheological properties to account for the better performance of thickened fluids used as liquid chargings in liquid dispersing devices. A too rapid breakup of the liquid mass was in many cases a disadvantage. The use of various thickening materials added to liquids was found to partially overcome the too rapid breakup. However, thickened fluids differ in rheological properties from ordinary fluids, the viscosity being independent of the rate of shear. The thickened fluids investigated are of two main types, first, solutions of a basic aluminum soap in gasoline, and second, methacrylate copolymers dissolved in gasoline, with or without the addition of a soap such as sodium stearate. For this study it was necessary to design and construct suitable devices such as a viscosimeter constructed from the bed of a jeweler's lathe, a viscosimeter constructed to subject the fluid to an oscillational force, a high pressure jet to subject the fluids to treatment analogous to that which they would receive under the conditions of actual use in a flame thrower or other device where they are ejected from a small orifice under high pressure, a device to obtain a measurement of the "stringiness" shown by a fluid. In addition to the original instruments devised, viscosimeters of many well-known types such as the Clark-Holman, MacMichael, etc. have been employed. Sufficient detail of the apparatus original to this work is contained in the report to enable other workers to duplicate and use these devices. The theoretical considerations of thickened fluids developed in this report have been applied in the main to study of a breakup of unignited jets and the ejection of the incendiary material as applicable to the M69 bomb. Graphs, tables, photographs and drawings.

PB 20603. DAVENPORT, A. T. "Perbromol" or tetrabromoketodihydrobenzene, a neutralising agent for destruction of mustard gas. (Edgewood Arsenal Chemical Div Rept 67). Jan 1922. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the preparation, tests and stabilization of "Perbromol", C_6H_2OBr. A table summarizes the tests made for its preparation from phenol and bromine. A yield of 95% can be obtained easily. The Perbromol broke down too readily, with the formation of tribromophenol. Tests were conducted to test the rate of decomposition and ways to retard the decomposition. Oils containing halogens, preferably fully chlorinated or brominated were used, but when this mixture was applied to fabrics, the Perbromol still broke down, leaving a deposit of tribromophenol in the form of long crystals. Attempts to stabilize Perbromol failed. It was decided to discontinue work upon the stabilization of this product, especially when other substances were found that were more effective for the purpose than Perbromol.

PB 22081. ELKINS, H. B. Screening smoke mixtures of ferric chloride, zinc oxide, and aluminum. (CWS Tech Div Memo Rept 634) Apr 1943. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
The object was to find substitutes for the ingredients of the present HC (hexachloroethane) smoke mixture. A satisfactory screening smoke mixture can be prepared from anhydrous ferric chloride (53%), secondary grained aluminum (8%), and zinc oxide (39%). In comparison with the smoke from Type C filled grenades, that from ferric chloride mixture seemed to possess: (a) less volume, (b) greater persistency, (c) greater whiteness, (d) less irritancy. Glossary is attached.

ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES

Communication Equipment

German

PB 9063. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur nachrichtenübertragung mit impulsen. (An arrangement for message transmission with pulses). German patent application T61138 VIII a/21a4 applied for Nov 6 1944 and still pending. Original inventor: Baeyer, v. 1944. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9090. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur nachrichtenübertragung mit in ihrer zeitlichen lage beeinflussten impulsen. (An arrangement for message transmission with time controlled pulses). German patent application T61203 VIII a/21a1 applied for Nov 28 1944 and still pending. Original inventor: Baeyer, v. 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9017. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anrufverfahren für ein drahtloses nachrichten-verkehrsnetz (Calling system for a radio communication net). German patent application T 57007 VIII a/21a4. Mar 6, 1942 still pending. Original inventor: Bartels. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This invention pertains to the use of two tone signals to activate the alarm relay of the called station. The number of available audio signals is considerably reduced, viz. a set of 55 parties will require only 10 different audio signals by using this invention against 55 by having only a single calling signal.

PB 9073. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Drahtlose gegensprechanlage (A wireless intercommunication system). German patent application T57166 VIII a/21a4 Mar 31 1942 still pending. Original inventor: Dr. Bruckmann. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9018. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Drahtlose kommandoanlage. (Wireless command system). German patent application T57026 VIII a/21a4 applied for Mar 6 1942 and still pending. Original inventor: Bartels. 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9069. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur selbsttätigen scharfabstimmung eines überlagerungsempfängers. (An arrangement for the automatic sharp tuning of a heterodyne receiver). German patent application T57155 VIII a/21a4. Applied for Mar 27 1942 and rejected. Original inventor: Maas. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9059. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Hochfrequenzsender mit einrichtung zur phasenmessung. (A high-frequency transmitter with an arrangement for phase measurement). German patent application T57136 VIIIa/21a4 March 24, 1942 still pending. Original inventor: Dr. Paul. 1942. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9074. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Kondensatormikrofon (A condenser microphone). German patent application T57168 VIIIa/21a2 Mar 3, 1942, still pending. Original inventors: Dr. Benecke and Dr. Batsch. 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9033. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Mit mikrofon und lautsprecher an jeder sprechstelle versehene, einen gemeinsamen verstärker benützende gegensprech- und kommandoanlage. (Intercommunication and command system with a central amplifier, microphone, and loudspeaker at each station). German patent application T57084 VIII a/21a2, Mar 17, 1942 still pending. Original inventor: Bartels. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9062. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Ohne elektrische verstärkung arbeitende ortsveränderbare schallwiedergabeanordnung hoher leistung. (A high power transportable sound reproducing system operating without the use of an amplifier). German patent application T57132 IXa/42g March 24, 1942, still pending. Original inventor: Dr. Benecke. 1942 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9095. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Pendelfrequenzempfänger. (Super-regenerative receiver). German patent application T61202 VIII a/21 a4 applied for Nov 30 1944 and still pending. Original inventors: Vogt and others. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
The oscillation frequency is produced by means of a grid condenser and a grid deflecting resistance to the back coupled tube.

PB 9092. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur nachrichtenübertragung mit impulsen. (A circuit arrangement for message transmission with pulses). German patent application T61231 VIII a/21a2 applied for Nov 30 1944 and still pending. Original inventors: v. Baeyer, Mann. 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9080. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Übertragungseinrichtung für sehr kurze wellen. (Transmitting arrangement for very short waves). German patent application T57023 VIII a/21a4 applied for Mar 9 1942 and still pending. Original inventor: Gerhard. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9068. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur reintonaufzeichnung und -wiedergabe (A method of high fidelity sound recording and reproduction). German patent application T57154 IXa/42g Mar 27 1942 rejected. Original inventor: Blaum. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This application refers to sound-on-film equipment.

PB 9070. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verzerrungsfrei arbeitende gleichrichterschaltung (A distortionless rectifier circuit). German patent application T57156 VIIIa/21a4 Mar 27 1942 rejected. Original inventor: Dr.Buschbeck. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated. A diode detector circuit for AM signal.

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United States

PB 22860. BOAN, J. P. and others. Collected informal communications on articulation tests of interphone equipment. (OSRD Rept 1572; NDRC Rept 17.3:20; NDRC Res on Sound Control Informal Communication 6, 8, 10-13, 15, 16, 18, 22, 36) Jul 1943. 95 p. Price: Microfilm-$1.00 - Photostat-$7.00

The tests described in this collection of informal communications were conducted in the Psycho-Acoustic Laboratory at Harvard University where a battery of loud-speakers in a large sound-chamber make it possible to generate noises typical of those found in airplanes. By means of these noises it is possible to reproduce the acoustic conditions under which communication systems are actually employed in the field. IC-6, Articulation tests on interphone equipment. Measurements of the response characteristics of the microphones, earphones and amplifiers, for which articulation tests are reported here, have been carried out under the direction of Dr. L. L. Beranek, and appear in a progress report of the National Research Council Committee on Sound Control, "Response characteristics of interphone equipment," January 21, 1942. IC-8, Articulation tests on Rawlings tank helmets, insertion type earphones (Western Electric 714-C), electro-voice differential carbon microphone (anti-noise). This equipment was tested with respect to the intelligibility of speech under various conditions of quiet and noise. IC-10, Design and test of an improved interphone system for aircraft. Measurements carried out by the Committee on Sound Control have shown that the intelligibility of speech conveyed over present interphone equipment can be improved by as much as 30 percent when proper consideration is given to the following aspects of design: (1) earphone resonance, (2) distortion in microphone and amplifier and (3) acoustic seal between the earphone and the ear. IC-11, Articulation and response measurements on microphones in A-9 oxygen mask; a comparison of MC-253 and MC-254 (Western Electric) with Waters Conley type MIM-1 and MIC-1. Intelligibility of speech was measured in the presence of a typical airplane noise at an intensity level of 115 db. The microphones were mounted in the A-9 oxygen mask and were connected to a high-fidelity amplifier (Thordarson) having an essentially flat response and negligible non-linear distortion. A minimum of three announcers read lists of 100 words each to a crew of nine listeners. The listeners wore high-fidelity moving coil earphones (RCA). The MC-253 and MC-254 were superior to the MIM-1 and MIC-1. IC-12, The increased intelligibility gained by extending the response of an earphone to 4000 cps. Under all conditions tested, the cut-off at 4000 cps gave better articulation than the cut-off at 3000 cps. Furthermore, although the advantage gained by the additional 1000 cps varies for different announcers, every announcer showed a positive advantage. IC-13, Articulation tests of tank interphone and radio equipment. When high-fidelity microphones and earphones are used, amplifiers that are flat, or nearly so, provide better articulation than amplifiers whose response varies widely with frequency; earphones with flat response curves are decidedly superior to peaked phones such as the B-14 units in the HS-23 headset; a noise canceling microphone, such as the electro-voice unit which was tested, will improve communication considerably; when any interphone or radio system is subjected to the stress of intense noise, communication will be greatly improved by the use of headphone mountings which attenuate the ambient noise before it reaches the air; the throat microphone T-30A is generally unsatisfactory from the point of view of intelligible communication. IC-15, The design of aviation helmets to protect against ambient noise. (A preliminary report). IC-16, The effect on articulation of low frequency cut-off in interphones. Interphone systems designed for use in noisy environments should pass a range of frequencies as wide as possible; in any case, the low-frequency cut-off should not be higher than about 250 cps. IC-18, Articulation tests on interphone systems during flight. Flight tests and laboratory tests both agree in demonstrating that the standard Army and Navy interphones now in service are decidedly inferior to systems that could be readily supplied. Improvement in the intercommunication systems, it is concluded, must be effected at the four points described. IC-22, Attenuation provided by various earphone holders for use in tanks. From the point of view of convenience, reliability, and the speed with which it can be put on the head, the crash helmet with design 6 earphone sockets is to be preferred to most other devices. IC-36, The effect of acoustic treatment in aircraft on the intelligibility of speech. This report was compiled in answer to a request from the Audio Section, Aircraft Radio Laboratory, Wright Field. When the spectrum of the ambient noise simulates that of an airplane noise, intelligibility improves when either (1) the overall level is reduced without changing the spectrum, or (2) reduction is effected in the high-frequency components of the noise, above 600 cps, without materially altering the overall level. Tables and graphs are included.

PB 22845. BOAN, J. P., and others. Performance of communication equipment in noise. (OSRD Rept 901) Oct 1942. 134 p. Price: Microfilm-$1.50 - Photostat-$9.00

This report prepared by the Psycho-Acoustic Laboratory, Harvard University, records the outcome of an experimental program designed to test and evaluate the instruments of communication employed in the Services, and to develop methods for improving the transmission and reproduction of speech by interphone and radio. This research, carried out in cooperation with the Bureau of Aeronautics, the Army Air Forces and the Signal Corps, demonstrates three things: (1) Communication systems now in service are inferior in quality and effectiveness; distortion of speech sounds due to the low fidelity of microphones and earphones, plus the masking caused by loud ambient noises, make oral communication uncertain and unreliable; (2) Means are at hand to remedy the most glaring deficiencies; a resourceful application of modern developments to the problem of transmitting intelligence will approximately double the effectiveness of interphone and radio; (3) ultimate perfection of communication demands that each link in the total system be designed to complement and work effectively with every other link; the technical problems involved call for a program of research, development, procurement and operational policy. The most fundamental problem now demanding solution appears to concern the advisability of changing over to low-level microphones -- magnetic or moving coil -- in order to take advantage of their low distortion, greater reliability, and potentialities for wide frequency response and high fidelity. Procedures and findings of tests of overall communication systems, microphones and earphones are described. Tables and graphs are included. An appendix contains a reprint from an informal communication covering articulation tests on interphone systems during flight, dated Aug. 15, 1942.

PB 22556. KRITER, K. D. The effect of voice intensity of the output voltage of various microphones. (NDRC Res on Sound Control Informal Communication 74) Jun 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

Since military microphones are sometimes employed to measure or monitor the intensity of the voice used in interphone or radio communication, it is of interest to determine to what extent the voltage generated by these microphones is directly proportional to voice level. This experiment was designed to test the linearity of various microphones as a function of voice intensities ranging from a whisper to a shout. Report prepared by the Psycho-Acoustic Laboratory, Research on Sound Control, Harvard University, describes procedures and findings of tests. The measurements demonstrate that magnetic microphones respond linearly to increasing voice intensities, whereas the relative voltage output from carbon microphones grows progressively smaller as the level of the voice is raised. In this respect, however, carbon microphones differ widely among themselves. The most linear is the noise-canceling lip microphone; the most nonlinear is the T-30-() throat microphone. A schematic diagram of the equipment used and graph, are included.

PB 22656. McCLAIN, E. F., Jr. A distortion reducing stylus for disc reproduction. n. d. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

This paper presents a stylus design which gives the low distortion of a small tip radius and at the same time maintains two point contact and freedom from "groove skating". Diagrams showing stylus design are attached. The report comes from the Naval Research Laboratory.

PB 19806. SHAW, W. A. and others. An evaluation of the acoustic insulation and the acoustic sensitivity of the Harvard design S-C earphone socket. (NDRC Res on Sound Control Informal Communication 116; NDRC Rept 17.3:156) Apr 1945. 14 p. Price: Microfilm - 50¢ - Photostat - $1.00
Improvements in communication result not only from refinements of transmitting and receiving apparatus, but also from bettering the earphone sockets by which the received intelligence is conveyed to the listener's ear. This report describes the development by the Psycho-Acoustic Laboratory, Harvard University, of the Harvard design. S-C earphone socket, designed for use in headsets. Tests of its acoustic insulation and sensitivity were conducted, and it proved equal or superior to other sockets. It is molded of neoprene and neoprene sponge and may be easily and cheaply manufactured. It has reduced susceptibility to dirt, grease, and fungus growth. Photographs, diagrams, and graphs are included.

PB 22852. SHAW, W. A. and YATES, D. E. Development of insert tips for use with miniature earphones. (OSRD Rept 6179; NDRC Rept 17.3:208) Oct 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
The effectiveness of speech communication is often impaired by the noise which exists in the immediate vicinity of the listener. This noise can be partially combatted by earphone cushions and sockets designed to exclude noise from the listener's ears (see OSRD Reports 826, PB 22844, and 1491, PB 22845). The object of the present report from the Harvard Psycho-Acoustic Laboratory is to present another type of device for excluding noise. Because it extends a short distance into the ear canal, and because it contains a channel through which sounds emanating from an attached earphone are directed toward the eardrum, the device is called an insert coupler. After an examination of several commercial couplers designed for hearing aids, a new insert coupler, the Harvintip, was developed by the Harvard Psycho-Acoustic Laboratory with the cooperation of the University of California at Los Angeles. Photographs of models are shown. Attached to model M-8 is a U. S. Army type R-30 miniature telephone. The earphone attached to model M-9 is an experimental miniature dynamic earphone manufactured by the Permoflux Corporation. A discussion of the sensitivity of the Permoflux MDR-1 and of the Western Electric R-30 extended range earphones when used with the Harvintip is presented. Appendix I described the development of the Harvintip, and Appendix II the construction of a single-cavity laboratory mold for the model M-7 Harvintip. Photographs, graphs, drawings and tables are included.

PB 17780. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Instruction book and drawings for Navy model TBK-1 (60 cycle) radio telegraph and telephone transmitting equipment, and modification #2, dated Jan 18, 1937. (Instruction Book 5780). Oct 1934. 701 p. Price: Microfilm-$7.50 - Photostat-$47.00
The TBK-1 equipment described in this instruction book is a combined intermediate and high frequency equipment for use ashore. It consists of a 500 watt, 2000 to 18,100 kc, CW, MCW and phone transmitter, plus a 1-kw, 300 to 2000 kc, CW and MCW telegraph transmitter. The rectifier unit is provided in duplicate in order to permit simultaneous operation of intermediate and high frequency transmitter units; a separate power transfer is provided for switching either transmitter to either rectifier. Duplicate remote control units are provided to permit control of both transmitters for telegraph operation over land lines. Single-channel speech input equipment is also provided. Photographs, curves, schematic diagrams, tables, and commercial bulletins on certain component parts are included. The manufacturer is Westinghouse Electric and Manufacturing Company.

PB 23457. U. S. WAR DEPARTMENT. Installation of radio equipment in car, half-track M2. (Tech Manual 11-2701). May 17, 1944. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
This manual provides methods and procedure based upon actual field experience, for installation of radio equipment in the M2 half-track car. Items required to make a complete operating installation are listed for each radio set. Installations covered include the following radio sets: SCR-245-P, SCR-510, SCR-608, SCR-193-G, SCR-284, SCR-508, SCR-628, SCR-593, SCR-506, SCR-528, and SCR-610. Diagrams illustrate the text.

PB 23462. U. S. WAR DEPARTMENT. Installation of radio equipment in carrier, personnel, half-track, M3. (Tech Manual 11-2714) Dec 1944. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual provides methods and procedure, based upon actual field experience, for installation of radio equipment in the M3 half-track personnel carrier. Items required to make a complete operating installation are listed for each of the following radio sets: SCR-193-H, SCR-245-S, SCR-506, SCR-508, SCR-510, SCR-528, RC-58, SCR-608, SCR-610, and SCR-628. Diagrams illustrate the text.

PB 22247. U. S. WAR DEPARTMENT. Intercommunication set PA-8; and addenda, dated Jun 25, 1945. (Tech Manual 11-2564) Jun 4, 1945. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
This set is used in the field to maintain communications between a battery executive officer and a number of remotely located gun crews. The design permits the use of a maximum of six loud speakers. The set may be used wherever means of communications to remote locations are desired. The equipment consists of a control-amplifier unit, four loudspeakers, battery boxes, a chest set, microphone and headset. Loudspeakers also serve the function of microphone. The power output is 1.5 watts and the communication range is satisfactory up to five miles. The microphone is a small carbon microphone worn on the upper lip. This manual describes installation, operation, and maintenance of the equipment. Photographs and diagrams are included.

PB 22061. U. S. WAR DEPARTMENT. Interphone equipment RC-38. (Tech Manual 11-715) Apr 13, 1942. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a four-station, intravehicular communication system for use in the light tank M2A3. In addition to providing voice communication between crew members, the equipment enables the radio operator and tank commander to retain partial control of the vehicular radio apparatus for intervehicular and base station voice communication. The major components are the interphone amplifier, control boxes, microphones, and headsets. This manual contains a description, instructions for installation, operation, and maintenance, and supplementary data. Parts lists, installation drawings, and diagrams are included.

PB 21926. U. S. WAR DEPARTMENT. Public address set PA-2-B. (Tech Manual 11-449) Oct 1944. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
This instruction manual covers a complete, portable, public address system used for the amplification of speech or music. The equipment contains two microphones, a phonograph and an all-wave radio tuner, any or all of which can be plugged into the amplifier so that programs may be reproduced by the PA system. It can be used indoors or outdoors. Six permanent-magnet metal-horn loudspeakers and a portable power unit are part of the equipment. Photographs, installation drawings, and schematic diagrams illustrate the manual.

PB 21925. U. S. WAR DEPARTMENT. Radio set AN/MRC-1. (Tech Manual 11-602) Dec 15, 1944. 103 p. Price: Microfilm-$1.50 - Photostat-$7.00
Radio set AN/MRC-1 comprises a radio system which provides facilities for high-speed, high-power CW transmission and reception in addition to the normal functions of radio set SCR-399. It is intended for fixed station use but is completely mobile. It consists of a modified SCR-399, a 2-kw amplifier, and a high speed Boehme operating station.

The set is designed for duplex operation but may be used to transmit and receive on the same channel. Separate receiving and transmitting antennas are used. The frequency range for the SCR-399 transmitter is 2 to 18 mc; for the SCR-399 receiver, 1.5 to 18 mc; for the AN/MRC-1 transmitter, 2 to 13 mc; and for the AN/MCR-1 receiver, 1.5 to 18 mc. Signal emission for the SCR-399 is voice and CW; for the AN/MRC-1, CW only. Power output is 2000 watts. The various components of this equipment, including the Boehme teletype equipment, are described in detail in other War Department Technical Manuals, especially TM 11-281 for the SCR-399, TM 11-850 for the radio receivers, and TM 11-377 for the Boehme equipment. Photographs and diagrams are included.

PB 23438. U. S. WAR DEPARTMENT. Radio set SCR-593-A. (Tech Manual 11-859) Mar 2, 1943. 85 p. Available from the Supt Docs, Washington 25, D. C. 15¢.
This instruction manual covers employment and maintenance of a self-contained six tube, push-button radio receiver, designed for portable or vehicular operation. Its power is obtained from a two-volt storage battery contained in the receiver housing. It receives voice amplitude-modulated signals over a frequency range of 2 to 6 mc. The antenna may either be clamped to the receiver housing for portable operation or to a vehicular support.

PB 23414. U. S. WAR DEPARTMENT. Radio sets SCR-178 and SCR-179. (Tech Manual 11-231) Dec 15, 1941. 41 p. Available from the Supt Docs, Washington 25, D. C. 15¢.
Subject items are intended for point-to-point and ground-to-plane communication between 75 mm. and pack artillery units and aircraft for observation purposes. These radio sets are portable, low power, high frequency transmitters and receivers. They have a sectional mast antenna of steel tubing approximately 28 feet in height when erected. Power for the transmitter is furnished by a hand generator and that for the receiver by dry batteries. Either set may be operated at any frequency throughout its range of 2400 to 3700 kilocycles. CW, MCW and voice transmission are provided. This manual contains description of sets; instructions for operation, servicing, repair and storage; and supplemental data and parts list consisting of operating voltages and currents of vacuum tubes, and circuit elements for transmitter, modulator, and radio receiver. Photographs and drawings are included.

PB 23417. U. S. WAR DEPARTMENT. Radio sets SCR-194 and SCR-195 and auxiliary equipment. (Tech Manual 11-238) Apr 17, 1942. 65 p. Available from the Supt Docs, Washington 25, D. C. 15¢.
These radio sets were intended for point-to-point voice communication within the artillery battalion and infantry regiment. They are highly portable, low power, high frequency sets which include transceivers and may be used to communicate over distances up to five miles. All the equipment required is carried on the back of the operator in a canvas bag. For vehicular operation radio set SCR-195 includes steel mast sections and a mast base with means of connection to the set to replace the telescoping tubular antenna used when the set is carried on the operator's back. Power for transmitting and receiving is supplied by one dry battery. Radio set SCR-194 has a frequency range from 27.7 to 52.2 megacycles using two oscillator coils, and affords 62 channels with 400 kilocycle separations. Set SCR-195 has a frequency range from 52.8 to 65.8 megacycles using one oscillator coil, and affords 33 channels with 400 kilocycle separation. The various parts and their operation are described and instructions are given for assembling, operating, and removal from service. Numerous photographs, drawings, and wiring diagrams are included.

PB 22229. U. S. WAR DEPARTMENT. Radio sets SCR-281-A, -B, and -D. (Tech Manual 11-244) Apr 1945. 98 p. Price: Microfilm-$1.00 - Photostat-$7.00
SCR-281 sets are amplitude-modulated radiotelephone transmitters and receivers designed for operation on coastal and harbor vessels or in land stations for communication with such vessels. The sets cannot be used for radiotelegraph transmission or reception. Frequency range is 1700 to 2750 kc and power output of the transmitter is 25 watts. The receiver is an a-m superheterodyne. This manual describes operation and maintenance and contains photographs and diagrams.

PB 21934. U. S. WAR DEPARTMENT. Radio sets SCR-522-A, -T2, SCR-542-A, and -T2. (Tech Manual 11-509) May 1945. 124 p. Price: Microfilm-$1.50 - Photostat-$9.00
Radio sets SCR-522 and SCR-542, described in this instruction manual, are medium-power, amplitude-modulated radio sets, consisting of a transmitter, receiver, radio control box, interphone control box, dynamotor unit, and accessories. The equipment is designed for installation in vehicles, such as the jeep, to provide voice communication from one vehicle to another or between these vehicles and aircraft. Four preset, crystal-control channels for frequency changes are provided for push-button selection. Frequency range is from 100 to 156 mc. The average power output of the transmitter is from 8 to 10 watts. Voice and tone signals are transmitted. The receiver is a crystal-controlled superheterodyne. Various diagrams and photographs are included.

PB 22234. U. S. WAR DEPARTMENT. Radio telegraph transmitter, Radiomarine model ET 8003. (Tech Manual 11-831) May 1945. 96 p. Price: Microfilm-$1.00-Photostat-$7.00
This transmitter consists of a 4-tube medium power transmitter, a power control and charging panel, a control panel, a motor generator, and accessories. It is designed primarily for use on small boats as the main or emergency transmitter. The frequency range is 355 to 500 kc; a tone signal is emitted; and the power output is 30 watts in a 4-ohm 750-mmf antenna. This manual gives operating and maintenance instructions and contains photographs and diagrams.

PB 22016. U. S. WAR DEPARTMENT. Radio transmitter BC-365-F and remote control unit RM-10-F. (Tech Manual 11-828) Aug 24, 1944. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
This manual covers installation, operation, and maintenance of the subject equipment. The transmitter has a frequency range from 150 to 550 kc. The nominal rated r-f output is 350 watts, and the type of emission is CW only. Facilities for both amplitude and frequency keying are provided. Remote control is provided by a special unit. Diagrams and photographs are included.

PB 22254. U. S. WAR DEPARTMENT. Radio transmitting equipment BC-263. (Tech Manual 11-816) Apr 23, 1945. 101 p. Price: Microfilm-$1.50 - Photostat-$7.00
This equipment consists of a transmitter, remote control unit, and microphone. The transmitter is a four-channel crystal- or master-oscillator controlled, 75 watt CW radio telegraph or 50 watt radio telephone transmitter. It operates in the frequency range from 1500 to 10,000 kc and is suitable for remote control over two pairs of telephone lines. The radiated radio telephone signals are amplitude modulated. This instruction manual covers installation, operation, and maintenance. Photographs and diagrams are included.

PB 23506. U. S. WAR DEPARTMENT. Radio transmitting set AN/CRN-11. (Tech Manual 11-1077) Aug 3, 1944. 103 p. Price: Microfilm-$1.50 - Photostat-$7.00
This set serves as a normal radio range transmitter to guide aircraft or other suitably equipped vehicles on a predetermined course, and also provides one-way voice communication. It is intended for use under conditions where the equipment must be easily and quickly moved. It can be operated alternately as a normal A-N tone modulated radio range, as a nor-

al speech modulated, non-directional radio transmitter, and as a remotely controlled, speech modulated, non-directional radio transmitter, using a remote microphone. The frequency range is from 200 to 400 kc, and the nominal power output is 50 watts. This manual contains a description, installation, operation, and maintenance instructions, and supplementary data. Photographs, drawings, and diagrams are included.

PB 21919. U. S. WAR DEPARTMENT. Schematic diagrams for maintenance of ground radio communication sets. (Tech Manual 11-310) Oct 1943. 71 p. Price: Microfilm-$1.00 - Photostat-$5.00
Section I of this manual contains reference data which should be of value to all maintenance personnel, including lists of radio symbols and special abbreviations used in the diagrams. Section II is made up of maintenance sheets on particular units of BC- and PE- equipment.

PB 21936. U. S. WAR DEPARTMENT. Signal communication equipment directory: Radio communication equipment. (Tech Manual 11-227) Apr 10, 1944. 133 p. Price: Microfilm-$1.50 - Photostat-$9.00
This manual presents a condensation and compilation of data pertaining to Signal Corps radio communication equipment. Aircraft radio sets, fighter control sets, radio navigation sets, ground radio sets, radio intelligence and direction finding sets, and mine detectors are listed. For each set photographs, technical and tactical characteristics, and principal components are given.

PB 22069. U. S. WAR DEPARTMENT. Switchboard BD-14. (Tech Manual 11-331) Jun 30, 1941. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The switchboard described in this instruction book has a capacity of 40 line circuits and 8 cord circuits. Its use is in temporary or field military operations. It is also adaptable for use in small local battery telephone systems. Drawings and diagrams are included.

PB 23421. U. S. WAR DEPARTMENT. Switchboards BD-71, BD-72, BD-72-A, and BD-72-B. (Tech Manual 11-330) Oct 29, 1943. 27 p. Available from the Supt Docs, Washington 25, D. C. 10¢.
Switchboards BD-71 and BD-72, which are described in this instruction manual, are portable, monocord, magneto-telephone switchboards for use primarily in field wire systems. The BD-71 has a capacity of 6 lines and that of the BD-72 is 12 lines; otherwise they are identical. Drawings and schematic and wiring diagrams are included.

PB 21927. U. S. WAR DEPARTMENT. Telegraph central office set TC-3. (Tech Manual 11-358) Jul 2, 1943. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
Telegraph central office set TC-3, described in this instruction and maintenance manual, is a complete, transportable teletypewriter exchange or central office, which can be installed in any headquarters requiring the use of a switching central with a capacity of 10 teletypewriter lines or trunks. Two additional switchboards may be utilized to increase the line capacity. Each switchboard supplies the current and provides switching and repeating facilities for neutral operation of its 10 lines or trunks. Photographs and diagrams are included.

PB 22263. U. S. WAR DEPARTMENT. Telegraph sets TG-5, TG-5-A, and TG-5-B. (Tech Manual 11-351) Jun 1945. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
The telegraph set, described in this instruction manual, is a portable, open-circuit, field set designed for telegraph communication over short lines. The set may be used on ground return circuits obtained by simplexing a telephone circuit, or on other ground return or metallic circuits. It can also be used as a tone keyer for voice-modulated radio sets, permitting transmission of International Morse Code over such sets. Diagrams and photographs illustrate the report.

PB 22257. U. S. WAR DEPARTMENT. Telephone repeater TP-14. (Tech Manual 11-2007) Feb 19, 1945. 103 p. Price: Microfilm-$1.50 - Photostat-$7.00
The equipment described in this instruction manual is a portable unit for extending the telephonic communication range of two-wire military line facilities. It may be used at terminal or intermediate points, at the junction of different types of line facilities, and at points where entrance cables are used. It is a completely self-contained 22-type repeater and includes the necessary amplifiers, filters, equalizers, line balancing networks, and power supply equipment. Photographs and diagrams are provided.

PB 21149. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electrical communication systems equipment. (Tech Manual 11-487) Oct 1944. 536 p. Available from the Supt. of Docs., Washington 25, D. C. price: $1.50
This manual provides descriptive matter and data on the electrical and physical characteristics of communication system equipment, together with Signal Corps stock numbers and logistical data. The material is written from the point of view of staff signal officers and communication organizations under their technical control. The manual is divided into 14 chapters: (1) Purpose and scope; (2) Illustrative problems; (3) Telephone station equipment; (4) Telephone centrals; (5) Portable AWS information centers; (6) Wire and cable and construction information; (7) European and United States cables and loading systems; (8) Electrical protective equipment; (9) Telephone line transmission equipment; (10) Telegraph equipment; (11) Facsimile equipment; (12) Power equipment; (13) Maintenance supplies; and (14) Radio equipment. In general the data in each chapter have been arranged in tabular form. Information is given only for electrical communication equipment used for ground communication systems. Photographs and illustrative drawings and diagrams are included.

PB 21159. U. S. WAR DEPARTMENT. SIGNAL CORPS. Training text and applicatory exercises for amplitude-modulated radio sets. (Tech Manual 11-496) Nov 1944. 289 p. Available from the Supt. of Docs., Washington 25, D. C. Price: $1.00
This manual is a basic text for use in training radio repairmen for Army equipment in a course of approximately 215 hours duration. It contains chapters on: Hand tools and soldering methods; maintenance and trouble shooting; moistureproofing and fungiproofing; frequency meter set SCR-211 and signal generator I-72; storage batteries; radio receivers BC-312, -314, -342, and -344; radio transmitter BC-191; radio set SCR-284; radio set SCR-299, -399, and -499; radio set SCR-506; and cathode-ray oscillograph. The chapters on radio equipment each have sections on theory of operation and on laboratory exercises. Photographs and diagrams illustrate the text.

Electronics

German

PB 23074. KAISER, H. F. German practice in industrial and military radiography. (U. S. Naval Tech Mission in Europe Tech Rept 564-45) Oct 1945. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
The present and war time status of industrial and military radiography in Germany is reviewed. Information on kinds, amounts, and location of industrial X-ray equipment is given. Special applications, classes of applications and standards for performance of radiography are discussed. A bibliography of recent German literature on X-ray technology is included. The report is illustrated with photographs and drawings of equipment.

PB 23092. KAISER, H. F. Research on super-conductivity at University of Erlangen, from an interview with Prof. R. Hilsch. (U. S. Naval Tech Mission in Europe Tech Rept 536-45) Oct 1945. 26 p. Price: Microfilm-50¢ - Photostat-$2.00

The research work of the cold laboratory of the University of Erlangen is reviewed. The principal line of research is a study of the superconductivity of metals at low temperatures and of chemical components, such as Nb_2N and Cu_2S. Investigation of NbN was difficult as it had a high decomposition temperature and evaporation techniques would have to be carried out at 1000° C. CuS was chosen as its decomposition temperature is about 125° C. X-ray investigations were also carried out to support the work on superconductivity. Apparatus for studying the optical and electrical properties of the superconductors at various low temperatures are illustrated and described. The apparatus for producing liquifying gases to be used as cooling agents was also described. Included in the report are diagrams for the preparation of the compound sample and means by which temperature studies from 1.1° A to 400° C. could be made. Appendix I is an English translation of Prof. Hilsch's report on the method of liquifying hydrogen. Appendix II is an explanation (in German) of Prof. Hilsch's method of precooling incoming gases without using a high pressure compressor.

PB 14620. SAWIER, C. B. Notes on interviews with German scientists on synthetic crystals in August and September, 1945. (For supplements see PB 15002, 15003, 15004). Oct 19, 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The loss of the natural deposit of quartz in the Ukraine produced a shortage of quartz stimulating work to produce synthetic quartz and other piezo-electric crystals. Until 1939 the quartz used by Zeiss in Jena came from Brazil. The author states that the German aircraft research organization used quartz crystals connected to a cathode ray tube to record stresses on a moving photographic tape. This was intended to measure explosion pressures and component stresses in aircraft structures. Quartz was also used as an accelerometer in different parts of the plane. A research employee of Zeiss makes potassium alum crystals for apochromatic objectives of microscopes. There are 12 parts to the lens of which potassium alum is one. It is an optically isotropic substance so that the lens can be cut in any direction. The main body of this document is taken up with the investigator's reports of interviews with men who tried to make piezoelectric crystals by synthetic means. The report is very disjointed. A brief description of the work of each researcher and the type of material each was working on is incorporated. Two rough sketches of equipment used by one of the research workers are appended. See also PB 15002, 15003, and 15004.

PB 9076. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Abnehmbarer stromabnehmer für variometer (A detachable current collector for variometers). German patent application T57182 VIIIa/21a4 Apr 2, 1942 still pending. Original inventor: Schneider. 1942. 6 p.
Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9064. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Abschirmbüchse. (A shielded box) German patent application T57137 VIIIa/21a4 March 25, 1942 still pending. Original inventor: Paschke. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated. A new shielding arrangement for high frequency vacuum tubes.

PB 9087. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Abstimmleitung für kurze wellen. (A tuning line for short waves). German patent application T61206 VIII a/21a4 applied for Nov 28 1944 and still pending. Original inventor: Priestal. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9196. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zum schutze des an eine rhombusantenne angeschlossenen transformators gegen überlastung durch atmosphärische entladungen. (An arrangement to protect the transformer of a rhombic antenna against overloading through atmospheric discharges). German patent application T61089 VIII a/21a4; Oct 6, 1944, still pending. Original inventor: Dr. Kotowski. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9045. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur anpassung einer hohlrohrleitung an einen widerstand (An arrangement to obtain an impedance match for waveguide). German patent application T57106 VIII a/21a4 Mar 20 1942. Patent granted under no. 762011. Original inventor: Dr. Gerhard. 1942. 4 p.
Price: Microfilm-50¢ - Photostat-$1.00

PB 9088. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur anregung eines hohlraumschwingers in zentimeterwellen. (An arrangement for the excitation of a cavity resonator at microwaves). German patent application T61208 VIII a/21a4 applied for Nov 28 1944 and still pending. Original inventor: Häring. 1944.
3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9019. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur drehung der polarisationsebene sehr kurzer elektrischer wellen in eine beliebige richtung (An arrangement for changing the polarization field of very short waves in a desired direction). German patent application T57022 VIIIa/21a4 applied for Mar 9 1942 and still pending. Original inventor: Gerhard. 1942.
3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9081. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur erzeugung gegenphasiger und gleich grosser ströme auf zwei koaxialleitungen. (Arrangement to generate equal amplitude currents in phase opposition in two coaxial lines). German patent application T61157 VIII a/21a4. Original inventor: Baeyer, v. 1944.
6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing.

PB 9094. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur erzeugung von rauschspannungsspitzen. (An arrangement for generating of noise voltage peaks). German patent application T61230 VIII a/21a2 applied for Nov 30 1944 and still pending. Original inventor: Mann. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9021. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur fortleitung sehr kurzer elektrischer wellen in einer hohlrohrleitung (Arrangement for the transmission of very short waves in a wave guide). German patent application T57028 VIII a/21a4 applied for Mar 9 1942 and still pending. Original inventor: Gerhard. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9049. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Anordnung zur kontrolle der fokussierung von kathodenstrahlen. (An arrangement to control the focusing of cathode rays). German patent application T57114 VIIIc/21g March 20, 1942, still pending. Original inventor: Schröder. 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9189. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Antennensystem mit schwenkbarer richtcharakteristik. (Antenna system with a changeable direction characteristic). German patent application T61000 VIII a/21a4 Sep 27 1944 still pending being an addition to application T60236 VIII a/21a4 PB 11026. Original inventor: Dr. Gerhard. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9064. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Befestigung von körpern, die grossen beschleunigungskräften ausgesetzt sind. (A method to insure that objects which are exposed to great accelerating forces remain fixed) German patent application T57134 VIIIc/21g March 24, 1942. Patent granted under No. 583/43. Original inventor: Graffunder. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated. A method to relieve pressure from electronic tubes, especially discharge tubes, in dive bombers, parachutes, and aircraft launched by catapults.

PB 9048. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Bildfängerröhre mit selbsttätiger verstellung der hauptobjektivblende. (An iconoscope tube with automatic adjustment of the main lens aperture). German patent application T57128 VIIIa/21al; March 20, 1942. Patent granted under No. 762547. Original inventor: Ansorge 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9197. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Bolometer für die direkte anzeige von hochfrequenzenergie. (A bolometer for the direct reading of high frequency power). German patent application T61063 VIII a/21a4, Oct 10, 1944 still pending. Original inventor: Haupt. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9075. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung an zahnradgetrieben zur erreichung spielfreien laufes (Arrangement to obtain geared drive without backlash). German patent application T57176 III 47h Apr 2 1942, still pending. Original inventors: Fässler, Sauer. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9009. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zum abgleich der frequenzkennlinie von abstimmitteln. (An arrangement for compensating the frequency characteristic of tuning devices). German patent application T57004 VIII c/21g applied for Mar 4 1942 and still pending. Original inventor: Mechau. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9250. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur breitbandtransformation eines gegebenen reellen hochfrequenzwiderstandes. (A method for the wide band conversion of a given true high frequency resistance). German patent application Jan 19 1945 still pending. Telefunken no. 8888. Original inventor: Dr. Burkhardtsmaier. 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9079. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur erleichterung der anpeilung von kurzzeitsendern. (An arrangement for simplifying the direction finding of short period transmitters). German patent application T61158 VIII a/21a4 applied for Nov 11 1944 and still pending. Original inventor: Haas. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9035. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur frequenzvervielfachung für sehr kurze elektrische wellen. (An arrangement for frequency multiplication of very short electric waves). German patent application T57086 VIII a/21a4 applied for Mar 17 1942 and still pending. Original inventor: Gerhard. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9013. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur gleichzeitigen aenderung der fortpflanzungsgeschwindigkeit einer hochfrequenzwelle auf zwei oder mehr doppelleitungen. (An arrangement for the simultaneous variation of the propagation factor of a high frequency wave on two or more two-wire lines). German patent application T57010 VIII b/21c applied for Mar 6 1942 and still pending. An addition to patent application T54755 VIII b/21c. Original inventor: Willers. 1942. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9091. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur schwenkung der strahlungscharakteristik eines trichters für zentimeterwellen. (An arrangement for varying the beam characteristic of a horn antenna for microwaves). German patent application T61301 VIII a/21a4 applied for Nov 28 1944 and still pending. Original inventors: Reichardt, Koch. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9086. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur strahlschwenkung bei einem hohlrohrstrahler. (An arrangement for beam deflecting with a waveguide radiator). German patent application T61091 VIII a/21a4 applied for Oct 21 1944 and still pending. An addition to patent application T60854 VIII a/21a4, PB 12203. Original inventor: Gerhard. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9008. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur tastung einer hochfrequenz führenden leitung. (An arrangement for duplexing in a high frequency line). German patent application T56995 VIII a/21a4 applied for Mar 4 1942 and still pending. Original inventor: Buhl. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9061. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Einrichtung zur uebermittlung von signalen auf ein sich in bewegung befindliches fahrzeug. (A method to transmit signals to a moving vehicle or vessel). German patent application T57125 VIIIa/21a4 March 25, 1942 still pending. Original inventor: Henkel. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9199. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrische entladungsröhre mit hohlraumschwingungskreis. (Electric discharge tubes with cavity resonators). German patent application T61061 VIII a/21a4, Oct 11, 1944, still pending. Original inventor: Dr. Graffunder. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9039. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrisches entladungsgefäss. (Electrical tubes). German patent application T57079 VIII c/21g applied for Mar 16, 1942 and still pending. An addition to patent application T56178 VIII c/21g. Original inventor: Gosslar. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This patent describes a vacuum tube in which the distances between the various internal elements can be changed.

PB 9077. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrisches entladungsgefäss (An electric discharge tube). German patent application T57178 VIIIc/21g Apr 2 1942 still pending. Original inventor: Dr. Tschoepe. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9084. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrodenanordnung zur anregung von biegungsschwingungen bei piezoelektrischen kristallen. (An electrode arrangement for the excitation of flexural vibrations of piezoelectric crystals). German patent application T61137 VIII a/21g applied for Nov 6 1944 and still pending. Original inventor: Schäfer. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9015. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektronenröhre für sehr kurze wellen. (Vacuum tubes for very short waves). German patent application T57005 VIII c/21g applied for Mar 6, 1942 and still pending. An addition to patent application T56094 VIII c/21g. Original inventor: Geiger. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9175. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Entladungsröhre für sehr kurze wellen. (Discharge tube for very short waves) German patent application T60971 VIIIc/21g Sept 21, 1944 still pending. Original inventor: Dr. Huber. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9180. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Entladungsröhrenanordnung für sehr kurze wellen. (Discharge tube arrangement for very short waves). German patent T61030 VIII a/21a4 Sep 22 1944 still pending. Original inventor: Dr. Huber. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9085. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Gegengekoppelter gegentaktverstärker mit im kathodenkreis liegender kopplungsimpedanz. (A negative feedback impedance coupled cathode loaded push-pull amplifier). German patent application T57138 VIIIa/21a2 March 25, 1942 still pending. Original inventor: Dr. Gürtler. 1942. 6 p. Price: Microfilm-50¢ Photostat-$1.00

PB 9089. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Halterungsanordnung für piezoelektrische schwingkristalle mit aufmetallisierten elektroden. (A holding arrangement for piezoelectric oscillation crystals with metallized electrodes). German patent application T61204 VIII a/21a4 applied for Nov 28 1944 and still pending. An addition to patent application T52933 VIII a/21a4. Original inventor: Schäfer. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9082. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Hochfrequenzleitung. (A high frequency line) German patent application T57145 VIIIa/21a4 March 25, 1942 still pending. Original inventor: Ruhrmann. 1942. 10 p. Price: Microfilm- 50¢ Photostat-$1.00
Illustrated.

PB 9083. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hochliegender vertikalstrahler. (A high situated vertical antenna). German patent application T57131 VIII a/21a4 applied for Mar 24, 1942 and still pending. Original inventor: Walter. 1942. An addition to patent application T56960 VIII a/21a4. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9196. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hohlraumantenne. (Hollow space antenna). German patent application T61068 VIII a/21a4; Oct 6, 1944 still pending. Original inventor: Troost. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9093. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hohlraumkreis für sehr kurze elektrische wellen. (A cavity resonator for very short electrical waves). German patent application T61239 VIII a/21a4 applied for Nov 30 1944 and still pending. Original inventors: Gerlach, Herzog. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9181. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hohlrohrstrahler. (Wave guide radiator). German patent application T60965 VIII a/21a4 Sep 26 1944 being an addition to application T57208 VIII a/21a4. Original inventor inventor: Dr. Gerhard. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9178. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hohlrohrverzweigungsschalter. (Wave guide branch switch). German patent T60963 VIII a/21a4, Sep 21 1944 still pending. Original inventor: Dr. Wehde. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9179. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Insbesondere für die erzeugung sehr kurzer wellen geeignete magnetfeldröhre (A magnetic field tube especially for the generation of very short waves). German patent application T61019 VIIIc/21g Sep 22, 1944 still pending. Original inventor: Dr. Lerbs. 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 9056. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Koordinatenschalter für fernsehzellenraster und dergleichen zwecke. (A synchronizing switch for the mosaic in television or for similar applications). German patent application T57130 VIIIa/21a1 March 24, 1942. Patent granted under No. 761831. Original inventor: Prof. Karolus. 1942. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9007. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Mit elektrischen wellen von vorzugsweise impulsform, arbeitendes rückstrahlverfahren. (Reflected beam procedure working by electrical waves, preferably of the pulsed type). German patent application T56994 VIII a/21a4 applied for Mar 4, 1942 and still pending. An addition to patent application T56962 VIII a/21a4. Original inventor: Kruse. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9016. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Neutralisierte gegentakt-mehrgitterröhre. (A neutralized push-pull multi-grid tube). German patent T42388 applied for Mar 6 1942 with number T57006 VIII a/21g. Original inventor: Klein. 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9072. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Oszillographenröhre zur festhaltung von vorgängen für eine längere seitdauer (An oscillograph tube for retaining images with long persistency). German patent application T57165 VIIIa/21r Mar 31 1942 still pending. Original inventor: Dr. Bartels. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9191. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Parabolspiegel. (Parabolic reflector). German patent application T61002 VIII a/21a4 Sep 29 1944 still pending. Original inventor: Fröling. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9084. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Peilanrichtung. (Direction finding system). German patent application T57055 VIII a/21a4 applied for Mar 14 1942 and still pending. Original inventor: Buhl. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9058. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Phasendrehgerät. (A phase shifting device). German patent application T57135 VIIIa/21a4 March 24, 1942 still pending. Original inventor: Dr. Rosenstein. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9046. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Phasendrehgerät. (A phase shifting device). German patent application T57107 VIIIa/21a4 March 20, 1942 still pending. Original inventor: Tantzen. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9055. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Phasenschieber. (A phase-shifter). German patent application T57144 VIIIa/21a4 March 24, 1942 still pending. Original inventor: Dr. Paul. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9084. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Regelbare induktivität ohne eisenkern für frequenzstabile hochfrequens-schwingungskreise, insbesondere von oszillatoren (Adjustable inductance without iron core for frequency-stable highfrequency circuits, especially of oscillators). German patent application T57085 VIII a/21a4 Mar 17 1942 still pending. Original inventor: Fröling. 1942. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9188. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Richtantenne für sehr kurze elektrische wellen. (A directional antenna for very short electric waves). German patent application T60999 VIII a/21a4 Sep 27 1944 still pending and being an addition to application T57204 VIIIa/21. Original inventor: Dr. Gerhard. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9194. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Richtantennensystem für die raumabtastung. (Directional antenna system for space scanning). German patent application T61003 VIII a/21a4, Oct 4, 1944; still pending. Original inventor: Maas. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9176. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Röhrenanordnung für ultrakurze wellen (A tube arrangement for ultra short waves). German patent application T60972 VIIIc/21g Sep 21, 1944, still pending. Original inventor: Dr. Kleen. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 9023. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Röhrengenerator für sinusförmige schwingungen (Vacuum tube generator for sine-shaped or near sine-shaped waves). German patent application T57029 VIII a/21a4 applied for Mar 11 1942 and still pending. Original inventor: Hasel, Violet. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing.

PB 9066. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Rückstrahlgerät. (A reflected beam device). German patent application T57143 VIII a/21a4 applied for Mar 27 1942 and still pending. Original inventor: Stier. An addition to patent application T61633 VIII a/21a4, PB 8353. 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9193. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltung zum übergang von einer erdsymmetrischen auf eine erdunsymmetrische hochfrequensanordnung. (Transformation from a symmetrical grounded to an unsymmetrical grounded high frequency system). German patent application T61087 VIII a/21a4, of Oct 4, 1944 in addition to patent 743669. Original inventor: Dr. Buschbeck. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9067. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung für fernsehbildzerleger (A scanning system for television). German patent application T57153 VIIIa/21a1, March 27, 1942, still pending. Original inventor: Theile. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9047. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung für sägezahngeneratoren für fernseh - und oszillographenzwecke (A circuit arrangement for saw-tooth generators for television and oscillographic uses). German patent application T57108 VIIIa/21a1; Mar 20 1942 still pending. Original inventor: Dr. Hasel. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9030. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung für verstärkerröhren. (Circuit arrangement for amplifier tubes). German patent application T57081 VIII a/21a2 applied for Mar 17 1942 and still pending. Original inventor: Filipowsky. 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This invention describes six individual amplifying circuits.

PB 9085. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur umwandlung von durch überlagerte rauschspannungen verformten impulsen. (A circuit arrangement for the transformation of heterodyned noise distorted pulses). German patent application T61128 VIII c/21g applied for Nov 1 1944 and still pending. Original inventor: Bayer, v. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated. This document will not reproduce well.

PB 9165. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Schwenkbarer richtstrahler. (A lobing beam antenna) German patent application T60902 VIIIa/21a4 Sept 9, 1944 still pending. Original inventor: Dr. Gerhard. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 9097. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Siedekühleinrichtung für elektrische entladungsgefässe. (A vapor cooling arrangement for electrical discharge tubes). German patent application T61221 VIII c/21g applied for Dec 5 1944 and still pending. Original inventor: Wolf. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9057. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Stossicheres elektrisches entladungsgefäss. (A shock-proof electric discharge tube). German patent application T57129 VIIIc/21g March 24, 1942 still pending. Original inventors: Bünger, Dr. Kleen, Graffunder. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

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PB 9174. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Ultrakurzwellenröhre mit hohlraumkreis. (Ultra short wave tube with a cavity resonator). German patent application T60970 VIIIc/21g Sept 21, 1944 still pending. Original inventor: Dr. Huber. 1944. 5 p. Price: Microfilm- 50¢ - Photostat-$1.00 Illustration missing.

PB 9037. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Variometer. (Variometer). German patent application T57100 VIII a/21a4 applied for Mar 18 1942 and still pending. Original inventor: Schneider. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9192. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zum züchten von piezo-elektrischen kristallen, insbesondere seignettesalzkristallen. (Method for growing piezoelectric crystals, especially Rochelle salt crystals). German patent application T61032 IV b/12c Oct 2 1944 still pending. Original inventor: Gerlach. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9071. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur abstandsbestimmung einer empfangsstation von einer impulse aussstrahlenden sendestation (Arrangement to measure the distance from a receiving station of a transmitting station radiating pulses). German patent application T57164 VIIIa/21a4 Mar 31 1942 still pending. Original inventor: Stier. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9022. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur kennzeichnung der einzelnen sender einer navigationszwecken dienenden sendergruppe (Method for the identification of the individual transmitters in a group of transmitters serving navigational purposes). German patent application T57024 VIII a/21a4 applied for Mar 4 1942 and still pending. Original inventor: Pröling. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing.

PB 9014. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur messung des abstandes eines seitabhängig auf dem schirm eines Braunschen rohres aufgezeichneten impulses. (Procedure for measuring the time interval of a pulse on the screen of a Braun tube). German patent application T56993 VIII a/21a4 applied for Mar 6 1942 and still pending. An addition to patent application T53012 VIII a/21a4. Original inventor: Buhl. 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9082. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Vorrichtung zum kontaktlosen zusammenkuppeln von teilen einer zentimeterwellenleitung. (An arrangement for coupling portions of microwave transmission line without contact). German patent application T61155 VIII a/21a4 applied for Nov 8 1944 and still pending. Original inventors: Protze, Schirp. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9012. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Vorrichtung zur korrektion von drehkondensatoren. (A method for the correction of variable capacitors). German patent application T57012 VIII a/21g applied for Mar 5 1942 and still pending. Original inventor: Hochau. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9060. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H. BERLIN. Vorrichtung zur selbsttätigen anzeige der höhe und/oder der kartenentfernung eines fliegenden zieles. (An apparatus to indicate automatically the altitude and/or the map distance of a target in flight) German patent application T57124 IXG/42c March 25, 1942 still pending. Original inventor: Johnske. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

Japanese

PB 22657. HOBBS, MARVIN. A survey of recent Japanese vacuum tube developments. Oct 1945. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
By interrogating the technical and research personnel of the Army and Navy radar and communications laboratories as well as engineers employed by the three leading manufacturers of vacuum tubes in Japan, it has been possible to determine recent design and research trends and the accomplished results. In this report the development of vacuum tubes for lower frequency application is traced through to the recent research on magnetrons capable of oscillating on wavelengths ranging from 10 cm to as low as 0.7 cm. The trends in other types of tubes in transmitters and receivers are also included. Photographs are appended. The report comes from the Operations Analysis Section, Far East Air Forces.

United States

PB 22661. BARNES, C. B. The AN/APS-4 aircraft radar. n.d. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
This report from the Naval Research Laboratory describes the aircraft radar AN/APS-4, giving its functions, operation, and circuits. The APS-4 is an X-band (9375 mc) radar, primarily designed for search duty. A two-line scan is provided for locating ships and land targets and a four-line scan for intercepting enemy aircraft. Beacon equipment is also provided as a navigational aid for "homing." Photographs showing installation in planes and component parts, and circuit and block diagrams are appended. (Report is undated, but evidently was prepared after January 1946).

PB 23121. CARTER, J. L. and OSBORNE, M. F. M. Report on hydrophone calibration by explosion waves. (Naval Res Lab Rept S-2179) Apr 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
The use of explosion waves in the relative calibration of a hydrophone offers a new method of approach to the problems of response measurement. Application of this method to two standard hydrophones in the frequency range 5-100 kc. gives a relative calibration which agrees with the relative calibration obtained by conventional continuous wave methods. The method may be applied to the calibration of projectors and other linear underwater sound transducers. More rapid analysis of the data is possible through the use of appropriate mechanical or electrical harmonic analyzers. Restriction to the use of explosion waves is not necessary as the method is applicable with any transient. The method also gives information concerning the explosion wave, if the absolute calibration of the hydrophone is known. Oscillograms and curves illustrate the report.

PB 1887. DANA, HOMER J. Block and squirter system for reduction of precipitation static. (Second Air Force, Operations Analysis Rept No. 15) Feb 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
Precipitation static charges arise under a wide variety of weather conditions which, particularly in the case of large, fast aircraft, render useless the radio equipment at the very time it is most needed. A device designated as the block and squirter system has been tested in the laboratory and on aircraft in flight and found far more satisfactory than existing equipment. The device superimposes a high

voltage alternating current upon the precipitation static charge. During one-half of each cycle the alternating voltage is additive to the existing static charge and accelerates the corona discharge which interferes with reception. During the other half cycle the alternating current partially neutralizes the static charge and clear reception is possible. An electronic switch shuts off the signal during the noisy half of each signal. The high frequency of interruption makes the signal appear continuous in reception. Graphs and diagrams are included.

PB 23528. GORE, SAUL. Mathematical tools in the theory of four terminal nets. (AAF ATSC Memo Rept TSELP5-29) Jan 1946. 128 p. Price: Microfilm-$1.50 - Photostat-$9.00
The purpose of this report is to collect the mathematical tools needed in studying linear, passive, bilateral electrical networks in the steady state with a pure harmonic input, and to derive and collect formulae for the various master problems concerned with filtering, matching, and phasing, especially for four terminal nets. Appendices cover the following subjects: I. On pencils of circles; II. On bilinear transformations; III. The positive transformations, the network group, and the group of a circle; IV. On the realizability, at spot frequencies; of positive transformations by networks. Graphs are included.

PB 27267. JENSEN, HOMER. Geophysical surveying with the magnetic airborne detector (AN/ASQ-3A). (Naval Ordnance Lab Rept 937) May 1945. 63 p. Price: Microfilm - $2.00 - Photostat - $5.00
The AN/ASQ-3A magnetic airborne detector is a fluxgate magnetometer used originally for detecting submarines but later modified for use in geophysical magnetic surveys from an airplane. Results of surveys conducted over magnetic anomalies of widely varying magnitude and intensity show that the instrument supplies accurate and consistant data which are more detailed and better related to geological structure than similar data obtained by standard group magnometer survey methods. Details are given of the installation in a single-engined Beech biplane and later in a twin-engined SNB-1, together with details of an aerial camera set-up which employs a split image optical system to indicate instrument readings on the photographs of the terrain so as to make possible the accurate correlation of magnetic data with aerial maps of the surveyed area. The component parts of the detector, principle of operation and electronic circuits are given. This publication includes drawings, graphs, photographs, and a list of references.

PB 19806. KRITTER, K. D. and others. The combined effects of clipping the peaks of speech waves in an AFB transmitter and limiting static peaks in an AMB receiver. (NDRC Res on Sound Control Informal Communication 93; NDRC Rept 17.3:154) Mar 1945. 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
The purpose of the experiment described in this report was to determine the combined effects upon the intelligibility of speech of (1) increasing the audio voltage gain and clipping the peaks of speech prior to transmission over an AFB transmitter and (2) limiting static peaks with the Vasmansdorff half-wave limiter, or clipper, in an AMB receiver. A number of work articulation tests were performed to test the clipping effect in transmitter and receiver. The noise limiter and peak clipping greatly improves reception in the presence of static. Possible improvements and further testing are suggested. Graphs and oscillograms are included in the report.

PB 19809. LICKLIDER, J. C. R. and NEWMAN, E. B. Field tests of pre-modulation clipping in the transmitter of a type 19 wireless set. (NDRC Res on Sound Control Informal Communication 121; NDRC Rept 17.3:158) May 1945. 8 p. Price: Microfilm - 50¢ - Photostat - $1.00
Field tests are described on the use of an audio "peak clipper" inserted ahead of the modulator of a Type 19 (Canadian) MK III wireless set. They resulted in a marked improvement in range and intelligibility. Essentially the principle of the peak clipper unit is to improve the efficiency of modulation by removing the high-amplitude parts of the speech wave before that wave is used to modulate the carrier. With optimal adjustment, the unit provided usable communication under conditions which entirely prevented voice communication with the unmodified 19 set. The test results are presented graphically.

PB 19807. LICKLIDER, J. C. R. and others. A premodulation clipper unit for voice-communication transmitters. (NDRC Res on Sound Control Informal Communication 100; NDRC Rept 17.3:168). Jun 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report from the Harvard Psycho-Acoustic Laboratory describes the design of a premodulation clipper suitable for incorporation into service radio transmitters. The circuit described illustrates one of a number of ways in which the basic idea can be reduced to practice. In each particular application, the characteristics of the transmitter into which the principle is incorporated will influence the design of the premodulation clipper to a considerable extent. The clipper, as applied to an AM transmitter, performs three basic functions: (1) It provides peak clipping which removes the high-amplitude parts of the speech wave before the wave is used to modulate the carrier; (2) it provides low-pass filtering which eliminates undesirable high-frequency components of the clipped speech wave; and (3) it introduces amplification, additional to that of the normal audio section of the transmitter, which produces full modulation of the carrier with what is left of the speech wave after clipping. Details of design and operation and methods of testing are given. There are curves, oscillograms, and a schematic diagram. See also PBs 19806 and 19809.

PB 23674. NEWELL, HOMER E., JR. A method for calculating electric field strength in the interference region. (Naval Res Lab Rept R-2638). Sep 1945. 83 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report sets forth a convenient method for calculating and plotting the electric field strength of an isotropic radiator versus horizontal distance along the surface of the earth. The suggested sequence of steps is thought to embody some simplifying and time saving features. To implement the method described, there are included graphs and tables of reflection coefficients, divergence factors, and various parameters needed in effecting the calculations involved.

PB 23620. OSBORNE, M.F.M. and HOLLAND, F. H. The acoustical concomitants of cavitation and boiling, produced by a hot wire. n. d. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
Data on the properties of a very simple, low-power underwater noise generator - a wire heated by a heavy electric current - are presented in this report. The dependence of the sound generated upon frequency, input power, wire size, material, and wire history were determined. It has a very broad frequency distribution. For small wires a large part of the sound is supersonic. About one part in a million of the input electrical energy appears as sound. This paper can also be considered as a study of cavitation noise, the cavities being produced by heat rather than by reduced pressure. Thus a new approach to the problem of cavitation noise is provided. As a study in heat flow, this report provides quantitative data on the acoustical concomitants of boiling. Included are detailed descriptions of the hydrophone and other experimental equipment and of the experimental program; drawings of the equipment, and plotted curves.

PB 23339. ROGERS, T. H. Final report covering development work done under contract OEMsr-1146. (HK-7 and HP-10V magnetrons). (NDRC Rept 14-423) Apr 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report deals with the work done by Machlett Laboratories, Inc. in development of manufacturing processes for the production of the HK-7 and HP-10V magnetrons. Master specification, drawings, and a performance curve of the HP-10V magnetron are

included. The second part of the report is concerned with development of the trigger tube. The purpose of the trigger tube work was to investigate the possibilities of: (1) beryllium as electrode material in series gaps, and (2) strong magnetic fields in the gap space. Results of tests are summarized. Assembly drawings and diagrams are included.

PB 23338. SPOONER, J. M. Report of operations of the project tube shop, April 1942 through October 1943. (NDRC Rept 14-348) Dec 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The Project Tube Shop was established to provide manufacturing facilities for experimental tubes to be developed at the Columbia Radiation Laboratory. The shop was also to construct experimental K band oscillators. In the 18 months covered in this report the shop had produced over 500 experimental tubes. Various designs of tubes are described. Experimental work was done on the following: A method of joining metals hermetically; a magnetron oscillator; a grid controlled magnetron oscillator; and a coupling for wave guide output. Nine diagrams are appended to the report.

PB 23136. TOUSEY, R. Variable density and variable color filters for use with radar screens to preserve dark adaptation. (Naval Res Lab Rept M-2539) May 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
In order to provide a means for control of the effect on night vision of aircraft radar screens, two filters were designed. The first was uncolored and of variable density, and consisted of two polaroid disks, one of them rotatable. The second filter included in addition to the polaroid disks a second rotatable member, a wave retardation plate, which permitted the screen to be made redder at the same time as dimmer. Both types permitted instantaneous blackout of the screen, which is not possible electrically, as well as nearly maximum brightness. A model of the first type was submitted to the Bureau of Aeronautics for flight test. The second type did not appear worth further development unless a P-7 screen with more emission in the red were available. A photograph, a sketch and curves are included in the report.

PB 27481. U. S. NAVAL ORDNANCE LABORATORY. Photographs of the magnetic airborne detector. n. d. 6 p. Price: Microfilm-$1.00 - Photostat-$1.00
Six photographs are presented showing the magnetic airborne detector in its streamline housing or "Bird". Close-ups are given as well as photographs of the detector in use with the bird suspended from an airplane.

PB 27321. U. S. NAVY DEPARTMENT. AN/ASQ electronic detection equipment; type specification (instructions for preparation). (Navy Aeronautical Specification N571) Feb 1943. 4 p. Price: Microfilm - $1.00 - Photostat - $1.00
The form of this type specification for AN/ASQ equipment is intended to be used by contractors, designers and manufacturers in the preparation of AN/ASQ equipment type specifications applicable to a specific type of AN/ASQ equipment. The headings and numberings in this publication correspond very closely to the general specifications for AN/ASQ equipment as given in Navy Aeronautical Specifications N570 (PB 27320).

PB 27320. U. S. NAVY DEPARTMENT. AN/ASQ equipment; general specification. (Navy Aeronautical Specification N570) Feb 1943. 8 p. Price: Microfilm - $1.00 - Photostat - $1.00
A general specification for AN/ASQ magnetic airborne detectors, which includes general requirements, methods of sampling, inspection and tests, packaging and packing and marking for shipment. Performance tests include calibration of field strengths by a moving magnet, and flight testing for background noise. Construction and material requirements are described, with provisions outlined for design and construction changes.

PB 27322. U. S. NAVY DEPARTMENT. AN/ASQ-3 equipment. (Navy Aeronautical Specification N572) Feb 1943. 4 p. Price: Microfilm - $1.00 - Photostat - $1.00
This specification covers the requirements for AN/ASQ-3 electronic detection equipment. As a part of the specification certain Bell Telephone Laboratory Specifications are listed. Performance and construction standards are given. Methods of sampling, inspection, and testing, and instructions for packaging, packing and marking of this equipment are given in Navy Aeronautical Specification N570 (PB 27320).

PB 27323. U. S. NAVY DEPARTMENT. AN/ASQ-3A equipment. (Navy Aeronautical Specification N597) Nov 1943. 7 p. Price: Microfilm-$1.00 - Photostat-$1.00
This specification covers the requirements for AN/ASQ-3A equipment. It is of the total field type, operating on a combination of approximate vector summation and the oriented detector principle. The detector element is oriented approximately by servo-mechanisms controlled by other magnetic detectors mutually perpendicular and perpendicular to it. The output of the detector plus the squared outputs of the orienting detectors are added to approximate the total vector within the limits of the orienting mechanism. Three frequency responses corresponding to speed ranges of 0-20; 20-50; 50-120 knots are available. The specification includes a list of the applicable Bell Telephone Laboratory Specifications, calibration curve, background noise, and sensitivity, a list of components included, and instructions for the sampling, inspection, tests, packaging, packing, and marking of the equipment for shipment.

PB 27325. U. S. NAVY DEPARTMENT. Installation specification, Model AN/ASQ-1 airborne detection equipment. (Navy Aeronautical Specification NI-145) Feb 1945. 19 p. Price: Microfilm-$1.00 - Photostat-$2.00
This specification gives in detail the space requirements, location of units and all information necessary for a satisfactory installation of the model AN/ASQ-1 airborne detection equipment. The mounting, mounting brackets, bonding, clearance for shock mounted units, shielding and power requirements are given. Instructions are given for the unpacking and inspection of the units with a table of the parts furnished. Installation drawings and wiring diagrams are included.

PB 27326. U. S. NAVY DEPARTMENT. Installation specification, model AN/ASQ-1A airborne detection equipment. (Navy Aeronautical Specification NI-146) Feb 1945. 21 p. Price: Microfilm - $1.00 - Photostat - $2.00
This specification gives in detail the space requirements, location of the units, and all information necessary for a satisfactory installation of the AN/ASQ-1A model airborne detection equipment. The mounting, mounting brackets, bonding, clearance for shock mounted units, shielding and power requirements are described. Instructions are given for the unpacking and inspection of the units, with a table of the parts furnished. Installation drawings and wiring diagrams are included.

PB 27324. U. S. NAVY DEPARTMENT. Installation specification for model AN/ASQ-3 airborne MAD equipment. (Navy Aeronautical Specification NI-125) Nov 1944. 26 p. Price: Microfilm - $1.00 - Photostat - $2.00
This specification gives in detail the location and mounting of all component parts of the AN/ASQ-3 MAD equipment. Mounting, electrical bonding and power requirements are given. A parts list showing quantity needed of each item is included. Assembly drawings and charts and wiring diagrams are given.

PB 27327. U. S. NAVY DEPARTMENT. Test specification for model AN/ASQ-1 airborne detection installations. (Navy Aeronautical Specification NT-140) Feb 1945. 4 p. Price: Microfilm-$1.00 - Photostat-$1.00
This test specification lists the test equipment necessary for testing model AN/ASQ-1 airborne detection equipment, the supplementary publications applicable to this model, and gives the pre-installation tests and adjustment, describing the locating of bench testing installations, the bench tests to be made, and the flight tests to be made after installation.

PB 27325. U. S. NAVY DEPARTMENT. Test specification for model AN/ASQ-1A airborne detection installations. (Navy Aeronautical Specification NE-141) Feb 1945. 4 p. Price: Microfilm - $1.00 - Photostat - $1.00
This test specification lists the test equipment necessaary for testing model AN/ASQ-1A equipment, the supplementary publications applicable to this model, and gives the pre-installation tests and adjustments, including the locating of bench testing installations, the bench tests to be made, and the flight tests to be made after installation.

PB 17706. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. 80 series radar, Field Engineers' service and installation bulletins, Nos. 1-120. (NAVSHIPS 900, 634) May 1945. 408 p. Price: Microfilm-$4.50 - Photostat-$28.00
These bulletins, originally prepared by the Ragtheon Manufacturing Company, contain supplementary information to the 80 series instruction books on matters of servicing, installation, and modifications. Photographs, drawings, and diagrams are included. 80 radar equipments are ship-board search installations.

PB 23504. U. S. WAR DEPARTMENT. Antenna AN-161. (Tech Manual 11-1075) Jun 15, 1944. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
Antenna AN-161 is a broadside array antenna, 37 feet 2½ inches wide and 20 feet 10 inches high, consisting of 32 dipoles, arranged in 8 vertical columns of 4 dipoles each. It is used in conjunction with radio set SCR-271-L and is designed for mounting on wind-resistant tower TR-20-A. The antenna is designed to withstand high winds and heavy icing conditions. The manual contains installation, tuning and maintenance instructions and is illustrated with photographs and diagrams.

PB 23488. U. S. WAR DEPARTMENT. Installation of radio and interphone equipment in light armored car M8. (Tech Manual 11-2702) Apr 13, 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual provides methods and procedures, based upon actual field experience, for installation of radio and interphone equipment in light armored car M8. Items required to make a complete operating installation are listed for each of the following radio sets and interphone equipment: SCR-506-(A), SCR-538-(A), SCR-628-(A), SCR-508-(A), SCR-510-(A), SCR-610-(A), SCR-528-(A), SCR-608-(A), and RC-99. Diagrams illustrate the text.

PB 23460. U. S. WAR DEPARTMENT. Installation of radio equipment in truck, 3/4-ton, 4 x 4, carryall. (Tech Manual 11-2710). Jul 22, 1944. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual provides methods and procedures, based upon actual field experience, for installation of radio equipment in Army 3/4-ton carry-all trucks. Items required to make a complete operating installation are listed for each of the following radio sets: SCR-193-J, SCR-528-(A), SCR-506-(A), SCR-245-T, SCR-510-(A), SCR-608-(A), SCR-508-(A), SCR-610-(A), and SCR-628-(A). Diagrams illustrate the text.

PB 23489. U. S. WAR DEPARTMENT. Installation of radio equipment in truck, 2½-ton, 6 x 6, cargo. (Tech Manual 11-2709). Jun 26, 1944. 35 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual provides methods and procedures, based upon actual field experience, for installation of radio equipment in 2½-ton cargo truck. Items required to make a complete operating installation are listed for each of the following radio sets: SCR-510 and SCR-610. Diagrams illustrate the text.

PB 22070. U. S. WAR DEPARTMENT. Lapping machine TL-312/PSM-1. (Tech Manual 11-2685). Jun 22, 1945. 80 p. Price: Microfilm-50¢ - Photostat-$4.00
This machine is used for intermediate and finish machine lapping of quartz crystal blanks. It is an adaptation of the conventional bench-type drill press with a motor, belt drive, and adjustable sheave arranged to drive the spindle at speeds ranging from 70 to 105 revolutions per minute. The crystal blanks are moved by a crystal carrier between two circular lapping plates. Operating and maintenance instructions are given in this manual, which is illustrated with photographs.

PB 23442. U. S. WAR DEPARTMENT. Preventive maintenance manual: Radio equipments RC-150-B, RC-150-C, RC-150-D, RC-151, RC-151-A, RC-151-D. (Tech Manual 11-1417) Aug 1, 1944. 65 p. Available from the Supt of Docs, Washington 25, D. C. 25¢.
This manual describes the preventive maintenance procedures that are to be applied to radio equipments RC-150 and RC-151, which are IFF radar units. Photographs and diagrams illustrate text.

PB 23443. U. S. WAR DEPARTMENT. Preventive maintenance: Radio equipment RC-145-A. (Tech Manual 11-1431) Aug 2, 1944. 63 p. Available from the Supt Docs, Washington 25, D. C. 25¢.
This manual describes the preventive maintenance procedures that are to be applied to radio equipment RC-145-A, a mobile IFF radar equipment. Construction, care and maintenance of tools, maintenance techniques, and working schedules are included, and photographs and tables illustrate text.

PB 23446. U. S. WAR DEPARTMENT. Preventive maintenance: Radio set SCR-682-A. (Tech Manual 11-1461) Jul 24, 1944. 102 p. Available from the Supt Docs, Washington 25, D. C. 35¢.
This manual contains a practical working schedule and detailed instructions for performing field maintenance of radio set SCR-682-A, a general-surveillance radar unit. A list of all tools supplied with the set, instructions for the construction of special tools, and instructions for the care and handling of tools are included. Tables and photographs illustrate the text, and a lubrication chart is presented.

PB 23449. U. S. WAR DEPARTMENT. Service manual for radio equipment RC-145-A; theory, trouble shooting, and repair. (Tech Manual 11-1531) Aug 21, 1944. 268 p. Available from the Supt Docs, Washington 25, D. C. 75¢.
Radio equipment RC-145-A is a mobile IFF unit capable of identifying, within certain limits, the particular aircraft which has been detected by the associate radar unit. The unit has a frequency of 157 to 187 mc. with 1 kw. peak power output. This manual presents a brief summary of the purpose and fundamentals of IFF, general and detailed description of the function and operation of the components of radio equipment RC-145-A, information on technique and methods of finding trouble in this equipment, information necessary for removal and replacement of all parts of the antenna, and a complete list of all replaceable parts. Tables, photographs, and diagrams illustrate the text.

PB 23448. U. S. WAR DEPARTMENT. Service manual for radio equipments RC-150-B, RC-150-C, RC-150-D, RC-151, RC-151-A, RC-151-D; theory, trouble shooting, and repair. (Tech Manual 11-1517) Aug 19, 1944. 268 p. Available from the Supt Docs, Washington 25, D. C. $1.00
The RC-150 and RC-151 are typical examples of the Mark III IFF interrogator-responsor equipment. The transmitter, which generates the pulses of radio energy sent out into space to trigger the transpondor in the plane or ship to be identified, has a high-frequency oscillator section which oscillates at a frequency within the IFF band of 157 to 187 megacycles. This manual presents the electrical and mechanical theory of the radio equipments RC-150 and RC-151, and information to aid the repairman in the maintenance, repair, and operation of the equipment. Tables, photographs, and diagrams are included.

PB 23447. U. S. WAR DEPARTMENT. Service manual for radio set SCR-682-A; theory, trouble shooting, and repair. (Tech Manual 11-1561) Aug 31, 1944. 344 p. Available from the Supt of Docs, Washington 25, D. C. $1.00
Radio set SCR-682-A is a transportable, general-surveillance radar unit, capable of spotting surface craft and low-flying aircraft under any weather or light conditions. The set is composed of three main units. Modulator unit BC-1194-A, Indicator unit BC-1225-A, and the spinner assembly. The transmitter system of the radar set generates r-f pulses of narrow width and high power (225 kw. peak) at a frequency of about 2,800 megacycles. This technical manual presents the electrical and mechanical theory of the set and summarizes the available information on the repair of the set. Diagrams, photographs, and tables illustrate the text.

PB 21156. U. S. WAR DEPARTMENT. SIGNAL CORPS.
Antenna kit for rhombic transmitting antenna; drawing RS-2-368-D. (Tech Manual 11-2617) Mar 1945. 46p.
Available from the Supt of Docs., Washington 25, D.C. price 25¢
This manual covers the construction of a three-wire curtain rhombic transmitting antenna. The purpose of the rhombic antenna is to direct radiation, thus providing a stronger signal in the desired direction of transmission. Seven sizes of antennas have been designed for operation over various distance ranges at frequencies of 4 to 22 mc. An installation diagram and other drawings are included.

PB 27564. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT, and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for AN/ASQ-1 and AN/ASQ-1A equipment. (AN 16-30ASQ1-3) Sep 1943. 302 p. Price: Microfilm-$7.00 - Photostat-$21.00
The purpose of this apparatus is to enable the crew of patrol aircraft to detect the presence of submerged or surfaced submarines by detecting their magnetic fields. The equipment consists of three sets of magnetometer elements, each of which is perpendicular to the other. If the detector is held in alignment with the earth's field, the two orienters will be in the zero field. If this system is forced out of alignment, the field measured by the detector will be the total field present, minus the cosine of the angle of displacement times the total field. The equipment consists of an amplifier, oscillator, dynamotor and a junction box and their mountings and fittings. This comprehensive manual includes a section on magnetic fundamentals and a general description of the equipment and its component parts followed by instructions for the installation, adjustment, operation, maintenance and testing of the equipment. Photographs, charts, graphs, diagrams, tables, oscillograms and a parts list are included.

PB 19810. VENEKLASEN, P. S. and RUDMOSE, H. W.
A thermal noise generator for acoustical measurements. (NDRC Res on Sound Control CIR-43; NDRC Rept 17.3; 187) Aug 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Many acoustical measurements require the use of a broad noise spectrum. Available sources, while quite satisfactory for many applications, show considerable variability of output and are not satisfactory for certain types of experiments. A noise source has been developed which is suitable for precise acoustial measurements. The generator uses noise due to thermal agitation of electrons within a conductor. Amplifier characteristics and design features are described. Schematic diagram and photographs of the experimental model are included. The research was done at Electro-Acoustic Laboratory, Harvard University.

Generators, Motors, Transmission, Distribution and Allied Equipment

German

PB 9166. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur vermeidung der kontaktabnutzung von wechselrichtern (An arrangement to prevent contact wear on inverters). German patent application T60929 VIIId/21d2 Sep 7 1944 being an addition to application T59641 VIII d/21d2, still pending. Original inventors: Leifer, Schilgen. 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

United States

PB 19000. U. S. WAR DEPARTMENT. Generating set, gasoline engine-driven, marine, Universal, 7½ KW model M-7500-M. (Tech Manual 55-3019) Jan 1945. 86 p.
Price: Microfilm-$1.00 - Photostat-$6.00
The Universal power and light plants, described in this instruction book, are designed for either portable service or permanent installation. They include 2-, 4-, and 6-cylinder, 4-cycle engines. Installation, operation, and maintenance instructions are given and the illustrations include photographs, drawings and diagrams.

PB 21932. U. S. WAR DEPARTMENT. Motor generator PU-20/C. (Tech Manual 11-978) Nov 21, 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
The generator assembly described in this instruction manual consists of a 1400-watt, 120-volt, 400-cycle inductor-alternator, and a 400-watt, 27-volt, direct-current generator. The motive power is a 3-hp, 1800-rpm, 115/230-volt, single-phase, 60-cycle electric motor. A weather-proof output box is mounted on the top of the stator shell. Photographs and wiring diagrams are included.

PB 23492. U. S. WAR DEPARTMENT. Power unit PE-99-B. (Tech Manual 11-923B) Dec 15, 1943. 117 p.
Price: Microfilm-$1.50 - Photostat-$8.00
This Power Unit is a self-contained, gasoline-engine driven electrical generator. The unit will furnish 7.5 kva, 120-volt, 60-cycle, 3-phase, alternating current. The 20 hp engine is mounted forward of and above the generator on a welded steel skid base, power being transmitted by means of 5 parallel V-belts. Following a list and description of the component parts, instructions are given for the installation and operation and maintenance of the engine and its component parts. Photographs, diagrams, tables, charts and a parts list are included.

PB 23497. U. S. WAR DEPARTMENT. Power unit PE-182. (Tech Manual 11-939) Oct 4, 1944. 183 p. Price: Microfilm-$2.00 - Photostat-$13.00
This is a self contained power plant consisting of 3 main components, a gasoline engine, power generator and control panel, mounted on a welded steel skid base. The gasoline engine is a vertical L-head, 4-cylinder, 4-cycle, liquid cooled engine with a 3 1/8-inch bore and a 4 3/8-inch stroke. The main generator is a 9.4 kva, 3 phase, a-c, separate inbuilt exciter of the revolving field type. The d-c generator, for separate excitation, is mounted on the same shaft as the main generator rotor. The control equipment is mounted on two panels, one for the generator assembly, and an engine control panel. Following an account of the functioning of these parts, are instructions for the installation, operation, maintenance and servicing of the unit and its component parts. Photographs, tables, diagrams, charts and parts lists are included.

PB 22060. U. S. WAR DEPARTMENT. Power unit PE-183-A. (Tech Manual 11-937) Dec 15, 1944. 158 p. Price: Microfilm-$2.00 - Photostat-$11.00
Description and instructions are given for a self-contained power plant consisting of three main components: A gasoline engine, a power generator, and a control panel. It is a 6.3-kva, 0.8-power factor, 5-kw, 120-volt, single-phase, 52.5-ampere unit. The generator is an a-c unit of the revolving field type with an inbuilt exciter. Photographs and diagrams are included.

PB 23491. U. S. WAR DEPARTMENT. Power unit PE-201-C. (Tech Manual 11-914C) Nov 26, 1943. 138 p. Price: Microfilm-$1.50 - Photostat-$10.00
This unit is a portable self-contained, electrical power unit, consisting of a one kw AC/DC generator, driven by a single cylinder, 4-cycle, air-cooled, 2-3/4 hp gasoline engine through dual V-belts. It is a special purpose unit for use with telephone carrier systems and is mounted in a rigid welded pipe frame. Following a description of its component parts are instructions for the installation, operation, maintenance and repair of the unit and its components. Labeled photographs, charts, diagrams and parts lists are included.

PB 23499. U. S. WAR DEPARTMENT. Power unit PE-210. (Tech Manual 11-947) Aug 29, 1944. 77 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a compact light weight electric generator set consisting of a single-cylinder air-cooled 2 cycle gasoline engine and a direct current generator designed to deliver 30 amperes direct current with voltage variable from 6 to 22 volts. The complete unit is contained in an open frame of tubular construction mounted on 4 rubber shock mountings. The unit is used principally for charging storage batteries or as added starting power in starting large units in sub zero temperatures. Following a description of the unit, are instructions for the installation, operation, maintenance and repair of the unit and its components. Photographs, tables, diagrams, drawings and parts lists are included.

PB 23498. U. S. WAR DEPARTMENT. Power unit PE-214-B. (Tech Manual 11-945) May 15, 1944. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00
This is a compact light weight electric generating set consisting of a gasoline engine and an alternating current generator. The engine is a single cylinder, 2 cycle air cooled unit with a 2 inch bore and 1½ inch stroke and is designed to operate satisfactorily on gasoline with an octane rating as low as 62. The generator is a single phase, 60 cycle unit of the revolving field type and is coupled directly to the engine crankshaft. The complete unit is contained in an open frame of tubular construction, mounted on 4 rubber shock mountings. A description of the unit is followed by instructions for the installation, operation, maintenance and repair of the unit and its components. Photographs, diagrams, tables and parts lists are included.

PB 21933. U. S. WAR DEPARTMENT. Power unit PE-215-C. (Tech Manual 11-941C) Jan 6, 1945. 84 p. Price: Microfilm-$1.00 - Photostat-$6.00
Power unit PE-215-C, described in this instruction manual, is designed to furnish three-phase power for 60-cycle operating equipment. It is a Diesel engine-driven, electric power plant that consists of a six-cylinder engine directly connected through a flexible coupling to an alternator with a top-mounted, belt-driven exciter. A free-standing, dead-front switchboard is provided for generator control. The alternator is rated at 50 kw, 62-½ kva. Photographs and drawings are included.

PB 21928. U. S. WAR DEPARTMENT. Signal equipment directory, power units. (Tech Manual 11-235) Apr 1945. 197 p. Price: Microfilm-$2.00 - Photostat-$14.00
This directory presents in condensed form the essential information on Signal Corps power units. In each case, a general description and an illustration of the power unit are presented together with detailed characteristics of engine and generator.

Miscellaneous

PB 22490. MORTENSEN, M. A. German development of the primary battery. (Naval Tech Mission in Europe Tech Rept 283-45) Aug 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report serves as a summary for a group of documents relating to the German development of the primary battery, particularly with respect to its use in torpedoes. One document on "The production of a lead-plated iron grating for use as supporting skeleton for the Pb_2 - electrode in the primary element PbO_2 - Zn^2 is translated in Appendix I of the report. The others are briefed only. The original documents are in the files of the Chief of Naval Operations, Navy Department.

PB 23500. U. S. WAR DEPARTMENT. Battery charger PE-219. (Tech Manual 11-982) Apr 23, 1945. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is an operating and maintenance manual for a battery charger designed to charge three BB-54-A batteries in series from a 6-, 12-, or 24-volt d-c source. The charger uses one plug-in vibrator which also serves as a rectifier. No tubes are used in the charger. It is intended primarily as a component of radio set SCR-619 but may be used with other sets. Photographs, drawings, and diagrams are included.

PB 22230. U. S. WAR DEPARTMENT. Charging set SCR-189. (Tech Manual 11-302) May 1945. 121 p. Price: Microfilm-$1.50 - Photostat-$9.00
The charging set described in this instruction manual is portable battery charging equipment consisting of a power unit, control board and connecting cord. The power unit is an electric generating set consisting of an air-cooled gasoline engine and a generator. It will deliver 550 watts at 40 volts, dc. The control board contains all necessary meters, controls, and connections for operation of three charging circuits. The maximum output of the charging set, per charging circuit, is 24 volts at 7.5 amperes. Photographs and diagrams are included.

FUELS AND LUBRICANTS

German

PB 25643. BARDGETT, H. Gelsenkirchener Bergwerke A. G. (G.B.A.G.), Rossstrasse - Essen, und Nordstern - Wanne Nickel. (CIOS File No. XXIII-18, Item 30) Jul 1945. 23 p. Price: Microfilm-$1.00 - Photostat-$2.00
Subject company, administered from central offices in Essen, owns 26 independent coal mines and 14 coke oven plants in the Ruhr area and 3 additional coke oven installations at blast furnace works. Its production in the last business year which can be considered normal (October 1943-September 1944) was 26.8 million tons of coal and 8.8 million tons of coke, representing approximately 20 percent and 27 percent respectively of the total production of coal and coke of the Ruhr area. The company employed over 85, 600 staff and workmen in September 1944. For the purposes of management of the numerous pits and coke oven plants the organisation was divided into four groups, each with separate administrative offices, namely Dortmund, Bochum, Gelsenkirchen and Hamborn. A list of the mines, coke oven plants and patent-fuel works in each group, together with data covering 1943-1944 relating

to output of coal, production of coke and patent-fuel, and the number of employees, is given in Appendix 1. A plant for the recovery of ethylene, methane and motor fuel gas by a process designed by the firm of Carl Still was in course of construction at the Nordstern plant, - Wanne-Eickel, but bombing practically destroyed it. The whole of the coke oven gas, about 1.7 million cubic meters per day, after purification, was to be washed with benzol at a pressure of 8 atmospheres gage and at 5° C. The gas was to be washed in four parallel streams in four bubble-type towers, each washing about 400,000 cubic meters per day, the amount of benzol in circulation being 350 cubic meters per hour in each tower. The benzol, enriched with C_1-C_4 hydrocarbons, then passed to the ethylene plant whereit would be stripped by steam at at mospheric pressure. This would give a crude ethylene product. The stripped benzol after passing through heat exchangers and coolers was to be re-circulated. The gaseous product would pass first to a 10,000 cubic meter gas holder from which it would be compressed to 42 atmospheres and fractionated in a series of columns. After cyanogen and carbon dioxide had been washed out with water, the C_2, C_3, and C_4 hydrocarbons would be again washed with benzol. The products from three fractionating columns would be respectively a methane product, an ethylene product and a propylene-butylene product. The ethylene product, consisting of approximately 86 percent ethylene, 35 percent ethane and 7 percent methane would be sent to Chemische Werke Hüls for use in the production of Buna rubber or alcohol. Half of the methane product would be compressed into cylinders for use as motor methane, the remainder being passed back to improve the heating value of the coke oven gas. The propylene and butylene hydrocarbons would not be separated, but after passage through a stabilising column and after purification by washing with caustic soda and water would be transferred to railway wagons as motor fuel. It was estimated that the daily production would be 25 tons ethylene, 15 tons motor methane, and 7.5 tons motor fuel gas. Appendix 2 consists of a description of the addition of coke breeze to coking coal in the coke-oven plant of the Gelsenkirchener Bergwerks A. G. Appendix 3 presents data on coal properties for coking and trommel tests of coke produced in a separate table for each of the groups: Dortmund, Bochum, Gelsenkirchen and Hamborn. Appendix 4 presents data on properties and composition of fine coal for coking. A list of documents obtained from the company and forwarded to London is included.

PB 25645. BARDGETT, E. Krupp, F., A. G., Altendorfer Strasse - Essen. (CIOS File XXXIII-16, Item 30) Jul 1945. 12 p. Price: Microfilm-$1.00 - Photostat-$1.00
The object of this visit was to obtain information about Krupp's coking practice, their methods of coal and coke testing, coal blending, and gas purification. Dr. Walter Damman said they had no experience in the drying of weakly caking high volatile matter coals. At their plant at Lothringen, however, where the coal was a good quality coking coal of about 23 percent volatile matter, it had been the practice to dry the coal at 80-90° C. in gas-heated rotary driers prior to coking. The coal was crushed before drying to size 0-10 mm. with about 60 percent below 3 mm. The driers were lined at one end with a chrome-nickel steel. The drying treatment caused no appreciable decrease in caking power of the coal. Oxidation of coal prior to coking with the object of modifying the caking characteristics is not used in practice, but laboratory work had shown that oxidation at 150-200° C. lowers the swelling pressure. Krupp's have had considerable experience in the blending of coals for coking. Their best quality coking coals, those from the Hannover and Constantin mines, contain about 23 percent volatile matter, but the supply of such coals is insufficient for the coking requirements, and it has been necessary to blend with them coals of somewhat lower or higher volatile matter from Saiser Neuack and Mont Cenis mines. Up to 30 percent of the latter coals are used in the blends. Other subjects discussed in the report include the following: Coke tests, gas purification, waterless gas-holders, and by-products. Appendix 1 shows data relating to coal and coke properties at nine of the Krupp works, and results of physical tests on the coke produced from these coals. Appendix 2 gives typical operating data at three of the coke plants for the months of March, 1944. A list of documents obtained from the firm is appended.

PB 25644. BARDGETT, E. Verein für die bergbaulichen Interessen (Bergbau-Verein) Meisingen-Ruhr. (Association for the mining interests. Mining association). (CIOS File XXXIII-15, Item 30) Jul 1945. 14 p. Price: Microfilm-$1.00 - Photostat-$1.00
The Bergbau-Verein (B.V.) which was first created as far back as 1858 as an association of mining interests in the Ruhr has since 1938 been responsible for the uniform direction of the organization of technical and economic research in Ruhr mining. Its research programs cover the general development of technical progress in all branches of mining, preparation and processing of coal and safety in mines. Close contact is maintained with industrial concerns, technical institutes and research organizations. An account of the organization and objects of the B. V. published in 'Jahrbuch für den Ruhrkohlenbezirk, 1942' is appended to the report. Subjects discussed in the report include the following: Ruhr coals, carbonisation, coal drying, coal briquetting, briquetting without binder, cost of briquetting, production of acids by oxidation of coal, oxidation of coal by air, active coal from carbon, and a list of low temperature carbonisation plants. Information given in this report was obtained from interviews with members of the staff of Bergbau-Verein.

PB 17899. BLUMBACH. Bestimmung der bauweise für das bauvorhaben 'Gladbeck-Benzin' der Hydrierwerk Scholven A. G. in Gelsenkirchen-Buer. (MIS VII 67g 7002976) Jun 1941. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
(Regulations for safe construction in the proposed 'Gladbeck-Benzin' installation of the Hydrierwerk Scholven A.G. in Gelsenkirchen-Buer.) This document lists various buildings and locations of processes within the Scholven hydrogenation plant at Gelsenkirchen and measures decided to be taken to avert mine disasters caused by natural disturbances and also by bombing attacks. Included in the processes listed are water gas plants, gas containers for nitrogen, hydrogen, carbon dioxide, and gasoline. In German.

PB 23739. COCKRAM, C. Visit to Bottrop-Welheim Hydrogenation Plant. (CIOS File XXX-104, Item 30) Aug 1945. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
This report represents the results of interrogation of plant personnel and information obtained on the site from documents at this plant, Ruhröl A.G., operated by Mathias Stinnes Company. Notes on the operation of the plant and on engineering matters have been incorporated into the report. This plant used two processes. It was primarily built to operate the Pott-Broche process for extracting coal with a solvent, which was originally tetralin and cresol, but later liquid phase middle oil from the hydrogenation of pitch was used. It was the intention to hydrogenate the extract in the liquid phase at 700 atmospheres but the difficulties of filtering the extract were not solved until late 1943. Also it was found that the extract was not as easily hydrogenated as bituminous coal tar pitch. There was a surplus of 700,000 to 800,000 tons per year of pitch in Germany and it was decided to hydrogenate pitch instead of extract. This was started in 1938 but schemes for hydrogenating Pott-Broche extract were still under consideration as late as August 1943. The Pott-Broche plant continued running and the extract was carbonised for the production of high quality electrode carbon for the steel and aluminum industries. The main product of the hydrogenation of pitch was fuel oil (100,000 tons per year) which was suitable for mixing with petroleum fuel oils. The liquid phase middle oil made was converted to gasoline in one stage at 700 atmospheres. The catalyst had been developed by the Stinnes concern, the particular interest in this catalyst being that it gives a gasoline with about 50% of aromatics in one stage with a yield of 80% based on the gasoline plus middle oil treated. This gasoline has a rather better rich mixture rating than D.M.D. gasoline. The output of gasoline was 30 to 35,000 tons per year. Until the end of 1943, the vapor phase stalls had insufficient capacity to treat the whole of the liquid phase middle oil and 10,000 to 12,000 tons per year was exported to other hydrogenation plants or for use as Diesel oil. 12,000 to 17,000 tons per year of butane were exported for use in cars. Some 28,000 tons per year of pitch stall residues were sold for briquetting. During 1944 it was intended to make 120,000

tons per year of fuel oil and 60,000 tons per year of gasoline. In May and June the vapor phase stall did achieve this output by drawing on middle oil stocks, but the pitch stall did not approach flow-sheet output. 60 tons per year of cresols were separated from liquid phase gasoline and were used as gum inhibitor for aviation fuel. The investigators were told that Welheim was the only source of inhibitor. It was considered by the investigators that this plant was an economically poor proposition. The overall hydrogen consumption efficiency on the pitch and tar oils treated appears to have been about 7.5% when making 60,000 tons per year of petrol and 120,000 tons per year of fuel oil. Nevertheless the plant made a useful contribution to Germany's fuel oil supplies and it made use of pitch for which no other use could be found.

PB 23738. COCKRAM, G. Visit to Scholven Hydrogenation Plant. (CIOS File XXX-102, Item 30) Aug 1945. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
Information given in this report was obtained by interrogating plant personnal and from documents on the site. Data from a study of drawings and notes on operating details and engineering matters are also included. The main purpose of the plant was to hydrogenate coal to produce aviation gasoline. The hydrogenation process for coal was the standard I.G. process operating at 300 atmospheres with tin and hydrogen chloride catalyst. The conversion of the middle oils produced was done in the vapor phase at 300 atmospheres with separate catalysts for saturation and for splitting. No new changes had been made since the start-up of the plant in 1937 which had given an increased yield of gasoline from coal. Two new processes were in operation at Scholven. Two stalls for the DHD process, a modification of the I.G. high pressure, high temperature aromatizing process, started operations at the end of 1944. The fraction of the hydrogenated gasoline boiling above 80-90°C. was treated at 510°C. at 50 atmospheres to raise the aromatics in the total gasoline from 12% to 45-50%. The overall yield was 77-79% based on the hydrogenated gasoline. The octane rating of the final gasoline was raised from 72 to 76-78. The loss of gasoline resulting from the introduction of this process necessitated the installation of an additional coal stall (5 running instead of 4) in order to maintain the output of gasoline at about 220,000 tons per year. A plant for the dehydrogenation of butanes had been in operation. This was the German version of the U.O.P. catalytic process and compared very unfavorably in size and output with U.O.P. plants. It employed a moving bed of catalyst with external regeneration of the catalyst. 22-24,000 tons per year of octanes were made by polymerization of the butylenes from iso-butane. The polymerization plant was replaced by an alkylation unit and n-butane was dehydrogenated. In this way it was expected to increase the output of octanes to 45-50,000 tons per year. This alkylation unit ran during the first six months of 1944 and was not in efficient operation when destroyed. The general impression of the investigators was that I.G. had used much more steel in the alkylation units than was really necessary because they did not realize the benefits to be derived from efficient mixing of the reactants and from having a very high ratio of iso-butane to butylene. For octane manufacture 16,000 tons per year of iso-butane was separated at Scholven and another 16,000 tons per year were imported from Gelsenberg. When the alkylation unit was put into operation there was a shortage of iso-butane and preparations were being made to isomerize n-butane to iso-butane. Some propane and all the ethane produced were exported to the rubber plant at Buls. Spare n-butane and propane were bottled for use in cars. 500 tons per year of phenols were extracted from the liquor produced by the hydrogenation units for use in resin manufacture. Photographs, tables, and flow charts.

PB 25651. GUNTHER, A. E. Reichsinstitut für Erdölforschung, Technische Hochschule, Hannover. (Institute for Petroleum Research, Technical High School, Hanover). (BIOS Final Rept 197, Item 30) Sep 1945. 8 p. Price: Microfilm-$1.00 - Photostat-$1.00
The object of this visit was to obtain an account of the work and the aims of the subject Institute which was founded in 1943 to provide the research that before the war had been available from foreign sources. With the development of the oil fields in the Hannover Basin, bringing an increase in the number of geologists required, it was decided to attach to the high school and Institut für Erdölforschung (Oil Geology) in Hannover as the most central locality. The aim of the institute was primarily fundamental research, but it also advised the industry on all questions concerning oil. It served to give higher education or research facilities to various branches of the industry, geologists, chemists, physicists, engineers, etc. As a Reichsinstitut it drew its funds from public sources, and therefore enjoyed independence. A list of subjects on which work was in progress appended to the report included the following: Fundamental work on oil-containing rocks; development of instruments for measuring constants in underground reservoirs, and for drilling control; development of new tests on hydrocarbons; new synthesis for lubricating oils; new methods of dewaxing in liquid phase; oxidation of liquid hydrocarbons; synthesis of new solvents, dewaxing, deasphaltizing; development of fractional distillation columns; examination of refinery problems which cannot be undertaken locally on account of lack of experience or equipment; testing mineral and fatty oil for the industry.

PB 23750. HOLROYD, R. Report on investigations by fuels and lubricants teams at the I.G. Farbenindustrie A. G. works at Ludwigshafen and Oppau. (CIOS File XXX-106, Item 30) Aug 1945. 133 p. Price: Microfilm-$1.50 - Photostat-$9.00
The Ludwigshafen and Oppau plants are largely independent I. G. factories. The former factory is a general organic chemical works specializing in dyes, dye intermediates, plastics and synthetic rubber, while the latter is a heavy organic chemical factory producing ammonia, methanol, higher alcohols and their derivatives. Before the war much of the I. G. research and development work was carried out at Ludwigshafen; the high pressure research section played a very active part in all hydrogenation developments. Investigation revealed that no large plant for synthetic fuels or lubricants had been operated at this target. Valuable information on synthesis gas production from hydrocarbon gases was obtained as well as interesting data on a number of chemical syntheses. The report presents under the following subject headings the information obtained in the course of various visits: Synthesis gas production, synthesis of ammonia, synthesis of methanol and higher alcohols, hydrogenation and related processes, lubricating oil, Fischer-Tropsch synthesis, miscellaneous chemical production, information on other German factories, I. G.-Japanese army negotiations, development of Wiekel pressure vessels and of high pressure vessels, and a discussion on development of hydrogen resistant steels. Of interest in appendices are a tabulation of heat exchangers used, cost calculations and a discussion of large scale production of synthetic fertilizers. Diagrams, flow sheets, and tables.

PB 25660. PERRYCOSTE, W. B. C. German graphitising furnaces at Meitingen (Siemens Plania). (BIOS Final Rept 337, Items 21,22,31) Feb 1946. 10 p. Price: Microfilm-$1.00 - Photostat-$1.00
The Siemens Plania Graphitising Factory at Meitingen (Bavaria) is normally concerned solely with the graphitising of amorphous carbons from Siemens Plania's Carbon Factories (and on occasions from Griesheim I. G. F.), and the subsequent machining operations. No graphitising was being carried out at the time of the visit, but a start had just been made on instructions from the Occupying Authorities, with some jobbing work in their machine shops. There was no damage whatever from bombing. The details of their latest furnaces are indicated in the diagrammatic sketch and the descriptions included in the report. There are about 12 furnaces. The current is supplied through aluminum conductors feeding the carbons at either end. At one end the lead out to the transformers is short, but that from the other has to traverse the length of the furnace. The traverse is made through aluminum conductors made in channel section. There are nine for the lead each side, supported on insulated stands, and the whole can readily be dismantled when the furnace is being charged or discharged. These conductors are arranged to cross each other so as to ensure even distribution of the current between them. The charge of carbons to be graphitised is built up in layers on the prepared bottom for the full length between the walls, with fillings of packing power. When the greater part of the charge has been built, side walls formed

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of heavy buttresses of a special concrete carborundum heat-resisting mixture, which they make themselves, are placed along both sides. These buttresses have cast-in eyes at the top to facilitate cranage. It was pointed out that at the temperatures reached in the furnaces, given as 3000° C., the packing flows like water, but that when cooling starts, after power has been switched off, it binds again so that the furnace side walls can be removed to increase cooling. When the charge has been built up to the top of the side walls, the furnace is covered with slabs of rough carborundum. Other subjects discussed in the report are the power supply, packing powder, carborundum, lead characteristics of furnace, labor and costs.

PB 23735. SMITH, R. H. and others. Oil recovery from Württemberg shale. (CIOS File XXX-18, Item 30) Jun 1945. 37 p. Price: Microfilm-50¢ - Photostat-$3.00

Four plants were visited to study the recovery of oil from shale. The Lias Oelschiefer Forschung GmbH is one of several plants financed by the Reich and constructed as a war emergency measure. It was only about 60% completed. It was to have been the first and only commercial installation of Schweitzer retorts. The Deutsche Oelschiefer Forschungs-Gesellschaft, Schomberg, Württemberg, was originally organized by the Reich in 1943 as a research institution. Ten commercial Meiler type plants, each installation capable of producing 1200 tons/month, were ordered installed in July 1944. Five of these commercial Meiler installations are ready to operate. Portland Zementwerk, Dotternhausen, is primarily a cement manufacturing organization with oil production of secondary importance to the company. The construction of an experimental oil shale distillation unit using molten aluminum alloy is practically completed. Kohle-Öl-Union von Busse Kommanditgesellschaft, Schorsingen, operated an experimental process for the recovery of oil from Württemberg shale by a distillation underground. This process, said to be unique, originated from the Russian work on the underground gasification of coal. The last section of the report is devoted to a description of Meiler plant equipment as it was found at Schomberg and to the operation of the equipment.

PB 23374. U. S. STRATEGIC BOMBING SURVEY. Ammoniakwerk Merseburg G.m.b.H., Leuna, Germany, subsidiary of I.G. Farbenindustrie A.G.; and Appendices I and II. (Rept 115; Plant Rept 1; Oil Plant Rept 1) Jul 1945. 565 p. Price: Microfilm - $6.00 - Photostat - $38.00

Leuna produced liquid fuels, ammonia, and various chemicals required by the German war machine. It was the second largest single German synthetic oil plant and the second largest German chemical plant. In 1943 Leuna produced about one-sixth of Germany's production of synthetic fuel, about one-seventh of her synthetic aviation fuel, and more than one-third of her synthetic nitrogen. This plant's primary raw material was brown coal, mined in open pits nearby. The plant covered 757 acres, of which about 23 percent was occupied by tanks, equipment and buildings. It was served by the Daspig Waterworks, and this compactly built area was also a primary aiming point. Five night "token" attacks were made on the Leuna plant in 1940. It was not attacked again until the spring of 1944, when it was placed on the priority list along with other oil targets for strategic bombing. In the next 327 days the 8th Air Force made 18 attacks by day and the RAF made 4 by night. The object of strategic bombing was to deprive the Germans of their supply of fuel. At the same time another very important but unsought result was obtained: A very large part of Germany's synthetic nitrogen production was eliminated, which had a very serious effect on her explosive industry. In these 22 strategic attacks, 85,074 bombs were released, of which 8,643 hit the plant area. Of the latter, 1,387 failed to explode. A total of 1,298 tons of bombs exploded in the plant during the 327-day period. More than 80 percent of this tonnage consisted of 500-lb. or smaller bombs. The average weight of all the bombs dropped was 374 lbs. With two exceptions, every 1944-45 attack made while Leuna was in production resulted in a complete shutdown. The length of these stoppages varied with the severity of the bombing, and the rate of recovery decreased as the attacks continued. The Germans estimated the total cumulative damage just prior to the last attack at 280,562,000 Reichsmarks (no basis for the conversion of these sums to dollars was available). The 500-lb. and lighter bombs did little critical and irreparable damage to major installations, but the accumulation of minor damaging effects, especially when the attacks were repeated frequently, overwhelmed the repair forces. Major damage was inflicted on some of the heavy equipment when 4,000-lb. instantaneously fuzed high explosive bombs were used. The primary cause of most of the damage surveyed at Leuna had been blast. The immediate cause of every shutdown at this plant was the loss of utilities, through the destruction of water, steam and other lines, and electric cables. Recommendations based on the findings at Leuna and applicable to strategic attacks on similar works elsewhere are made. Appendix I contains accounts of process information, translations of German reports on the air attacks of 1944 and 1945 and production figures for 1943; appendix II contains studies of the physical damage done to the whole plant area and to the hydrogenation area. Tables, graphs, diagrams, and photographs are included.

PB 23375. U. S. STRATEGIC BOMBING SURVEY. Braunkohle Benzin, A. G., Zeitz (and) Boehlen, Germany; Wintershall, A. G., Luetzkendorf, Germany. (Rept 116; Plant Rept 2) Jul 1945. 186 p. Price: Microfilm-$2.00 - Photostat-$13.00

Three targets in the strategic bombing that was undertaken in 1944-45 to deprive the German war machine of its supply of liquid fuel are considered. These plants were in central Germany and were parts of a synthetic fuel producing system based on the extensive deposits of brown coal in that region. The Braunkohle Benzin A. G. was known as "Brabag". The strategic bombing of all three plants began on May 12, 1944, and continued until the spring of 1945 when the plants were occupied by American ground forces. Six aerial attacks were directed at Zeitz, 14 at Boehlen, and 14 at Luetzkendorf; various sizes of high explosive bombs were used. Production was interrupted and curtailed by the attacks, but the plants showed remarkable ability to recuperate. The Zeitz plant never produced any lubricating oil after the first attack and its production of other products was only 16 percent of normal during the period of strategic bombing. During this same period the production of the Boehlen plant was 36 percent of normal, probably due in part to the small size of the bombs dropped in the first attacks and in part to the plants effective counter measures and the competence of its managers. No synthetic fuel was produced at Luetzkendorf after the first attack. The crude oil distillation plant, however, maintained a fairly high rate of production for several months. Evaluations and impressions of the strategic bombing of all three plants are given at the end of the report. Photographs, maps, tables, graphs, and diagrams are included. The appendix contains translations of the attack reports.

PB 23383. U. S. STRATEGIC BOMBING SURVEY. Ebano Asphalt Werke A.G., Harburg Refinery, Harburg-Hamburg, Germany. (Rept 124: Oil Refinery Rept 11; Oil Plant Rept 11) Sep 1945. 88 p. Price: Microfilm - $1.00 - Photostat - $6.00

The Harburg plant of the Ebano Asphalt Werke, A.G., was designed primarily for processing imported Mexican and Venezuelan crude, and as of 1942 had a normal annual crude oil capacity of 360,000 tons. During the war no new processes were introduced and no research was carried on except in mixtures or blends of asphalt obtained from mineral crude oil with various distillation products derived from hard coal and pitch. The attack data are tabulated. The total physical damage effect of the 13 raids over the period of June 1944 to Apr 1945 is estimated to amount to the destruction of 15 percent of the equipment, 60 percent of the buildings, and 80 percent of the tankage. The average length of time for repairs was six weeks. The plant could today, under normal conditions, be placed into operation within 6 to 8 weeks. The compact grouping of the principal units in the plant increased its vulnerability. Unfortunately most of the weight of attacks was spent either to the north or south of this compact area. Photo interpretation of damage for each attack was consistently under actual damage. Tank damage was fairly accurately interpreted. Detection of serious damage to steam, power, and water lines was not within the scope of photo interpretation. New

attacks were well timed to achieve maximum effect. The estimate of capacity was much below the actual capacity; the estimated monthly output was not very accurate when percentage of error is considered. Photographs, tables, and diagrams are included.

PB 23382. U. S. STRATEGIC BOMBING SURVEY. Europäische Tanklager - und Transport A. G.: (Finkenwärder Refinery) Finkenwärder, Hamburg, Germany. (Rept 123; Oil Plant Rept 10) Sep 1945. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00

The Europäische Tanklager - und Transport A.G. is located at the Petroleum Harbor at Hamburg. The plant has a Winkler-Koch combination cracking unit rated at 360,000 tons per year and a Borsig (Foster Wheeler) unit rated at 180,000 tons per year. The principal products are light finished oils, gas oils and fuel oils. The total physical damage effect of the six attacks over the period from June 1944 to April 1945 is estimated at approximately 80 percent destruction of the total number of buildings, tankage, and equipment in the plant area. Due to light damage to expensive processing units the present overall effect is estimated at 80% of the May 1944 investment. Up to April 1945 strategic bombing had deprived the enemy of approximately 30,500 tons of finished, semifinished, and crude products equivalent to 60 days operation of the Borsig unit. The chief cause for damage to tankage in this plant was fire, caused by the ignition of crude oil that had spread over a large area of the plant. The supplementary material in this volume consists of maps, bomb plots, diagrams, damage repair curves and tabulation, production tables, flow sheets, an ownership record, a physical damage summary, drawings, and photographs. The method of refining is discussed in Exhibit H-1.

PB 23366. U. S. STRATEGIC BOMBING SURVEY. Friedrich Thyssen Coking Plant, Hamborn, Germany; Nordstern Coking Plant, Gelsenkirchen, Germany; Dortmund-Hoerde Hüttenverein Coking Plant, Dortmund, Germany; Hansa Coking Plant of the Gelsenkirchener Bergwerke, Dortmund, Germany. (Rept 67; Coking Plant Rept 1) Oct 1945. 127 p. Price: Microfilm-$1.50 - Photostat-$9.00

This report summarizes information regarding the activities of each of the above four coking plants and the effects of Allied bombing on these plants, under the headings: (1) General summary, which includes information regarding location, size, production, labor force, damage in air raids; (2) the plant and its function in enemy economy, giving information regarding annual production, description of the plant and its equipment, utilities, ownership and management, and statistics on employees; (3) attacks, consisted of tables showing date of raid, number of airplanes used, and number and type of bombs dropped; (4) effects of bombing, giving information regarding physical damage, loss of production, casualties, absenteeism and recuperability; (5) check on intelligence which consists of checks on information previously given to bombing commands regarding these targets; and (6) exhibits, including photographs showing damage to installations, diagrams of plant layouts, master bomb plots giving location of bomb hits, and tables showing planned and actual monthly production, 1939 to 1945. The effect of the first raid on the Friedrich Thyssen plant in October 1944 was to reduce production of coke for that month to 40 percent of the pre-raid monthly average. Repairs to nearly all of the damage had been completed by January 22, 1945, when it was raided again with serious damage which caused all operations to cease. The plant was still idle at the time of inspection in May 1945. Based on the monthly average output of the Nordstern Coking Plant of 108,843 tons of coke in the last six months of 1943, the total loss in production of coke for the nine months from June 1, 1944 to Feb 28, 1945, amounted to 853,877 metric tons - the equivalent of 5.1 months of the average pre-raid monthly production. A heavy raid on this last date stopped operations. The Hoerde Coking plant produced an average of 83,589 metric tons of coke and 24,803,000 cubic meters of coke-oven-gas per month from September 1939 to January 1943. Physical damage from the first attack in May 1944 was light. The second attack on November 29, 1944 destroyed the benzol plant and did considerable other damage, and the third attack on March 12, 1945 caused complete cessation of production. The Hansa plant produced a monthly average of 118,614 metric tons of coke and 54,213,000 cubic meters of gas per month from January 1942 to January 1945. It was attacked on December 2, 1944, January 3/4, 1945 and February 3/4, 1945, the last attack making the plant completely inoperative.

PB 23370. U. S. STRATEGIC BOMBING SURVEY. German oil, chemical, rubber, explosives and propellents industries: Oil division final report. (Rept 109) Aug 1945. 251 p. Price: Microfilm-$3.00 - Photostat-$17.00

Germany entered the war with reserve stores for war needs of only 3.1 months' aviation gasoline, 1.9 months' motor gasoline, 1.8 months' tetraethyl lead, 2 months' nitrogen for explosives, and 2.4 months' rubber. Germany never recovered from this precarious position, and if her oil supplies had been cut off, her whole military effort on the ground and in the air would have collapsed in three or four months. The oil, chemical, explosives, and rubber industries were so interrelated that hurting one would hurt all. Gas generating plants turned coal into process gases; the other plants used the gases and other materials drawn from the coal to produce synthetic fuels and lubricants, chemicals, rubber and explosive products. The largest German chemical plant, at Leuna, consumed 338,000,000 cubic feet of hydrogen-containing process gas a day and 54,000,000 cubic feet of fuel gas. In the spring of 1944, the German oil industry was selected as a top priority target group by the U. S. Strategic Air Forces, with instructions to bomb all oil plants as heavily and as often as possible. The oil industry could have been destroyed by cutting off the supply of process gas but this would have necessitated very heavy bombing. Destroying vital utilities such as water, steam, and electricity was called the hard way since the bombings must be repeated so often. The survey of the Oil Division also showed that there was too little planning of bombing raids. No action had been taken against synthetic nitrogen and methanol. However, in a series of raids on oil installations, it was discovered that up to 91% of sources for synthetic nitrogen and up to 86% of sources for synthetic methanol had been lost to the Germans because of incidental and unrecognized destruction in these industries. Agriculture could not get enough nitrate and the German ammunition production also dropped. Their air defenses were therefore much worse. Too much attention was also paid to the bombing of cities and not enough to vital industries or processes. Proportionately, too few large bombs were dropped on German oil-chemical buildings and most of these were by the R.A.F. It was determined that 2000-4000 lb. bombs were several times as effective as the small 500 lb. or less bombs that were principally used. Too much attention was placed on nonvital parts of the oil processes. Small bombs broke some equipment but not much. Evidently large numbers of small bombs were used where visible bombings were possible and a scattering of bombs was desired. It was felt that better use should be made of visible bombing with greater accuracy. Many of the incendiaries dropped by the U.S.A.A.F. were snuffed out by the following high explosive bombs. In the opinion of German plant managers, the incendiary bombs would have been more effective if dropped several minutes after high explosive bombs. The short duration of the U.S.A.A.F. bombing raids permitted the Germans to leave their shelters and quickly check or extinguish the blaze. R.A.F. bombings were better organized, of longer duration, and were more feared by the German. The fire hazards of oil-chemical plants should be exploited by better use of incendiaries. Phosphorus should be incorporated in incendiaries whenever possible. Concealment of objectives by the Germans was not particularly effective, but the use of decoy towns, in some cases drew almost as much bombings as the real objective. In conclusion, it was felt by the American observers that even improved protective measures would fully protect American industries against enemy air attack. The only defense of American industry envisaged by the Oil Division is the elimination of the air attacks. This publication gives a comprehensive view of prewar and wartime Germany in regard to chemical and related industries, the planned and actual production, and the effects of the bombings. Numerous charts, tables and graphs illustrate the work. Maps show the location of the plants and photographs record the effects of the air raids on these plants. See PB 23371 for the appendix.

PB 23371. U. S. STRATEGIC BOMBING SURVEY. German oil, chemical, rubber, explosives and propellents industries: Oil division final Report, appendix. (Rept 110) Aug 1945. 191 p. Price: Microfilm - $2.00 - Photostat - $13.00

The uses, production and effects of air raids on nitrogen, methanol, calcium carbide, sodium cyanide, chlorine, sodium carbonate, high explosives, and their raw materials are described. This report also describes the methods of protection of German chemical and oil industries. The German plants were defended by anti-aircraft batteries and by fighter planes. Towards the end of the war, these were greatly reduced in effectiveness due to fuel and ammunition shortages. The Germans had passive methods of plant protection. The personnel was afforded some protection by the use of bunkers. Equipment, such as turbo-generators, compressors and pumps were protected by any means available: Protective walls, concrete, splinter walls of loose brick, etc. Tall equipment, such as distillation towers, were protected by brick walls or other means. Explosive plants had thick concrete roofs. Many oil or chemical pipelines were laid underground. These proved a problem when repairs were required. Camouflage was resorted to, as with the laying out of decoy plants and towns. Dispersal of plants was naturally desirable but was impractical except on a small scale. Appendixes A, B, C, D, and E contain supplementary data, illustrations, or tables, relating to corresponding sections in the main report. Appendix F has additional information and illustrations relating to a part of the section on Weapons Effectiveness and Bombing Techniques in the main report, and Appendix G is made up of tabular matter from the official records of the Army Air Forces. For main report, see PB 23370.

PB 23373. U. S. STRATEGIC BOMBING SURVEY. The German oil industry. (Rept 113) n. d. 188 p. Price: Microfilm-$2.00 - Photostat-$13.00

The report deals with the German oil industry and describes its importance in Germany's war effort, its vulnerability to aerial attack, the German attempts to protect it from such attacks, and to offset the effect thereof, the direct and indirect effects of the Combined Bomber Offensive, and the conclusions to be drawn therefrom. The study presented in this report is limited to the oil industry in Germany, Austria, Sudetenland, Alsace-Lorraine, Luxemburg, part of Poland, and part of Czechoslovakia, although Germany, at one time, dominated or controlled practically the whole of the European Continent, and thus made all continental industries subservient to its war effort. Germany's industry was based on the use of a minimum of petroleum fuels, but the dominant role assumed by aircraft, tanks, oil fueled ships and motorized transport in modern war has made liquid fuels an essential munition. The Nazis planned for, and actually constructed, a large but expensive synthetic oil industry. Thus Germany's oil industry built up with great effort and energy, after World War I, by American and Allied oil companies on the basis of imports, was gradually changed into an economic monstrosity of heavily subsidized production, and wrought into a weapon of war. Nazi plans to supplement insufficient production by an accumulation of large reserve stocks of vital oil products were only partly successive because of Germany's tight foreign exchange position, and the resistance of these companies against increasing their stocks in Germany beyond a quantity reasonably required for their trade. The report is limited essentially to liquid fuels and lubricants, i.e., gasoline (aviation and motor), diesel oil, and fuel oil, and does not deal with such products as paraffin wax, coke and asphalt. It also deals with the use of substitutes for automotive purposes, namely liquefied gas (Treibgas), generator fuels, and methane and town gas used for automotive purposes. Products like alcohol and benzol, to the extent used as motor or aviation fuel, are included in those categories and are not considered as substitutes. The document is profusely illustrated by graphs and charts of production, bomb tonnages, personnel, etc., showing their various interrelationships.

PB 23372. U. S. STRATEGIC BOMBING SURVEY. Report on underground and dispersal plants in greater Germany. (Rept 112) Oct 1945. 196 p. Price: Microfilm - $2.00 - Photostat - $14.00

As a result of heavy bombings, a gigantic underground and dispersal program began. It was shown that properly designed and ventilated oil plants could be operated underground with reasonable safety, but the Germans were confident of quick victory and started too late on the program. American observers felt that centralized underground plants connected by pipe lines would have been the most effective. The underground and dispersal program, as originally formulated, was expected to supply Germany with 82% as much aviation gasoline as had been produced in January 1944, 25% as much motor gasoline, half as much lubricating oil of all types, two-thirds as much aviation lubricating oil, and 88% as much diesel oil. But, despite prodigious efforts, only about a million barrels of straight-run gasoline and diesel oil and a small amount of a blending agent were obtained up to the end of the war. Seven high pressure catalytic hydrogenation plants were to have been built underground and one above ground, to produce 92,000 tons of aviation gasoline and jet plane fuel per month. They hoped to produce 41,000 tons per month of the motor gasoline, 25% of which was to go to the aviation industry. To produce motor gasoline from crude oil, the Germans planned 40 small distillation units in the hills, woods, quarries, and sometimes underground. In addition, 5 primitive distillation stills were built in bombed out industrial plants. These were continuous shell stills built from boilers and salvaged equipment. There were several operating steps in the production of lubricating oils and considerable storage of intermediate products was necessary. Therefore, dispersal of these plants was not feasible and plans were made to go underground. These plants were to have produced 35,000 tons per month of lubricating oils of which 6,000 tons would have been aviation grade. Diesel oil was to be produced largely as a by-product, but two plants were designed exclusively for this purpose. Six plants were being built to remove phenols from the middle oil produced in coal-carbonization plants, so that diesel oil and phenol for the chemical industry would have been available. Ten primitive plants were started for the extraction of oil from shale for diesel use. In all, Germany would have 159,000 tons per month of diesel oil, but its use to feed cracking units and a hydrogenation plant would have cut this down to 103,000 tons per month. A small Fischer-Tropsch plant was also to be built in the face of a cliff. The whole program called for 140 separate plants, costing 1,400,000 R.M. and would have required 200,000 men's labor for a full year. The scarcity of labor and materials, the loss of construction sites, and the damage to railroads interfered with this plan and in the last few months, it was cut by half. The German oil industry could have been paralyzed by strategic bombings even if the whole program had been completed. This report includes charts showing the utilization of the oil products, the labor needs and labor costs. Maps of the plant locations and diagrams of the plants and apparatus are shown. Photographs of the equipment, some of it underground, are also included.

PB 23378, 23379, 23380. U. S. STRATEGIC BOMBING SURVEY. Rhenania-Ossag Mineralölwerke, A. G., Hamburg, Germany. (Repts. 119, 120, 121; Oil Plant Reports 6,7,8) Oct-Nov 1945. Rept 6, 195 p. Price: Microfilm-$2.00 - Photostat-$13.00. Rept 7, 58 p. Price: Microfilm-$1.00 Photostat-$4.00. Rept 8, 39 p. Price: Microfilm-50¢ Photostat-$3.00.

The report here presented in three volumes covers the Harburg, Grasbrock, and Wilhelmsburg works of the Rhenania-Ossag Mineralölwerke A. G. The first volume is concerned with the Harburg plant, the largest lube oil refinery in Germany which has a capacity of 300,000 metric tons a year and a vacuum distillation capacity of 330,000 metric tons per year on the basis of German Crude, processing approximately 22 percent of the crude mineral oil allocated from prewar Germany and Austria. The plant contained large distillation units, a large lubricating oil processing plant and an asphalt manufacturing and filling plant. The principal products are highly refined, finished lubricating oils, light untreated oils, and asphalt, of importance in the order named. The lubricating oil plant was of modern design and has the largest capacity of any single plant in Germany. The total physical damage effect of the sixteen attacks over the period between June 1944 and April 1945

was approximately 75% of all the buildings and equipment in the plant area. By the end of 1944 strategic bombing had deprived the enemy of 69,000 tons of semi-finished products and approximately 128,000 tons of finished products. Man days consumed by reconstruction amounted to 600,000 over the above period. The second volume of this report is concerned with the Grasbrook works which is located near the center of the dock area of Hamburg. The principal features of this plant are the oil blending plant, the lube oil raffination units, the storage and shipping facilities and the barrel cleaning equipment, of importance in the order mentioned. The total physical damage of the ten attacks during the period from June 1944 to April 1945 was approximately 70% destruction or severe damage to all buildings and equipment in the plant area. The third volume of this report is devoted to the Wilhemsburg refinery which is located midway between the cities of Harburg and Hamburg. In peacetime this plant processed approximately 100,000 tons per year of gasoline and light oils. There was additional capacity for the the blending of light oils which needed no refining or other processing. The principal features of the plant were large storage plants, located near the center of the plot and small distillation and refining units in the area or in the southern section of the plant. Four attacks between June 1944 and March 1945 resulted in approximately 60% destruction of the tankage and processing facilities. Each volume contains a table showing attacks made on that target, the tons dropped, the number of bombs, and the number of hits on buildings and installations. There are also tables of production, maps and diagrams of the targets and photographs. Graphs and flow plans complete the illustrative material.

PB 23377. U. S. STRATEGIC BOMBING SURVEY. Ruhrool Hydrogenation Plant, Bottrop-Boy, Germany. Vols I-II. (Rept 118; Oil Plant Rept 3) 1945. 527 p.
Price: Microfilm - $5.00 - Photostat - $36.00
In 1936-1937, the Hugo Stinnes enterprises and other German coal interests were urged by the government to enter the synthetic field. In response, the Ruhrool Hydrogenation Plant was set up in connection with the Walheim Mine of the Stinnes group. In the original plant, a process was employed in which an extract was made from coal, and this extract then converted to oil by hydrogenation. Later it was decided to adopt a modification of the Bergius type of operation, using distillates from pitch and tar oil as raw materials, hydrogenating them in two steps at 700 atmospheres pressure producing (1) a middle oil and high grade fuel oil, and (2) aviation gasoline from the middle oil. The first expansion program of the Ruhrool hydrogenation plant was introduced in 1939-40. At this time it was decided to discard the hitherto practiced method of producing extract by using tetralin as a solvent in favor of middle oil produced in the first hydrogenation step. The second expansion program, 1931-43, was based entirely on this new procedure and included alterations and additions throughout the plant. The potential production capacity was thus substantially increased. Among the by-products made available were oxygen, ethylene, sulphuric acid, phenols and gasoline inhibitors. The normal rated capacity of the plant was close to 168,000 tons per year, but the expansion would have permitted production of 198,000 tons per year. In May 1944, the plant produced 4,700 tons of aviation gasoline, 6,300 tons of marine fuel, 1,000 tons of Treibgas, and 1,700 tons of coal extract. The aviation gasoline was of the highest quality (exclusively of alkylates and iso-octane) made in Germany. Fuel oil was of a high grade, low sulphur stock, containing relatively no sediment. The raw materials used were mostly heavy coal tar pitches. Hydrogen was made from coke and steam via water gas sets, and from coke oven gas by low temperatures gas separation. This plant was selected as a target by the US Strategic Air Services. On July 20-21, 1944, a heavy raid put the entire plant out of action and the subsequent production was very limited. In general, the American observers felt that the use of larger bombs and greater precision in bombing would have been much more effective. This report includes the use of plant personnel, the plant layout, diagram of the various processes, production tables, and a description of bomb damage with illustrations.

PB 23384. U. S. STRATEGIC BOMBING SURVEY. Synthetic oil plant, Meerbeck/Rheinpreussen, Meerbeck, Germany. Vols. I-II. (Rept 125; Plant Rept 10; Oil Plant Rept 12) Nov 1945. 554 p. Price: Microfilm - $6.00 - Photostat - $37.00
Volume I gives a summary of the work and the following subjects are thereafter treated: The plant and its function in the enemy economy, the attacks, the effects of bombing, recuperability cycle, target vulnerability, intelligence check, evaluations and impressions. The appendix to this volume includes a plant layout plan, equipment list, miscellaneous notes on equipment and operation, personnel records and production records from June 1931 through July 1944, product description and analysis, attack data, damage reports and air raid precautions. Volume II contains interrogation reports, drawings, charts, flow sheets, production charts, production flow sheets and photographs.

Japanese

PB 23754. PECK, E. B. and JONES, IRVIN H. Report on technical assistance on synthetic oils rendered the Japanese by the I.G. Farbenindustrie A.G. (CIOS File XXX-34, Item 30) Jul 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The extent and the quality of the assistance given by I.G. Farbenindustrie to the Japanese in their problems of synthetizing oils and motor fuels from coal is set forth in this report. The information was obtained through interviews in May 1945 with Dr. Fritz Ringer, Dr. Mathias Pier, Dr. Hoering, and Dr. Donath of I.G. Farbenindustrie. This firm gave a Japanese Commission, early in 1945, after a contract for the exchange of technical information had been signed, limited information on its technology of converting coal, coal tars, and the like, to liquid fuels. The Japanese Commission discussed nothing with representatives of I. G. Farbenindustrie relating to the status of Fischer-Tropsch plants in Japanese-held territory or their capacities. Included in this report is information received by I. G. Farben from the Japanese regarding low-temperature carbonization plants at Kinsei in Manchuria, Mukden and Hokkaido; data on a combined-operations plant projected for Sakhalin Island for the production of aviation gasoline from Utibuti coal and data analyzing Utibuti coal. A list of hydrogenation projects obtained from a document dated May 5, 1939, giving the location, proposed products and capacity of twelve proposed Japanese plants is included. Some information regarding hydrogenation plants in Japan is also given.

United States

PB 23137. ATKINS, DON C. and others. A laboratory evaluation of lubricating oils for naval fire control equipment. (Naval Res Lab Rept P-2541) May 1945. 30 p.
Price: Microfilm-50¢ - Photostat-$2.00
Laboratory tests were conducted to evaluate commercial petroleum oils, gear, clock, refrigerator and gyro oils, and several synthetic instrument oils. Results of a study of the low temperature characteristics, ability to prevent rusting, volatility and oxidation stability are presented in tabular form. A volatility requirement of maximum weight loss of 1% in 168 hours at 150° F. and a maximum viscosity change of 2% after the evaporation test excluded all but the Pioneer #10 aircraft instrument oil produced by Eclipse-Pioneer Division of the Bendix Aviation Corp., and AN-28 instrument oil produced by the Naval Research Laboratory.

PB 23621. HAIN, G. M. and others. Synthetic low temperature greases from aliphatic diesters. n.d. 39 p. Price: Microfilm - 50¢ - Photostat - $3.00

This report was prepared in the Naval Research Laboratory for the Bureau of Aeronautics. A series of low temperature greases was prepared from the aliphatic diesters thickened with lithium stearate and modified by the addition of small quantities of well-defined chemicals. The fluids used in these greases varied in viscosity from 4.6 to 60 centistokes at 100°F., and the freezing and pour points varied from -40°F. to below -100°F. The resulting greases resembled in texture and working properties the present low temperature petroleum greases specified by the Army and Navy. However, the high evaporation rates normally encountered in low temperature greases were eliminated without sacrificing any operating characteristics. These greases have good chemical stability as well as excellent oxidation stability. Two diagrams of grease workers, tables of the test data and two graphs are included in the report. This manuscript seems to have been prepared for publication in a professional journal.

PB 23769. HOTTEL, H. C. Studies on fuel projection from nozzles. Progress report, Apr 25, 1942. (OSRD Rept 615) Jun 1942. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
The original objective of the project reported herein was the study of the effects of nozzle design and fuel properties on the range obtainable from flame throwers. It was found that nozzles varying rather widely in type gave substantially identical results as to range obtainable. Thus the main effort of the work was shifted to a study of how range is related to the physical properties of the fuel. Range-versus-pressure data were obtained for various hydrocarbon fuel oils on one-quarter and one-half inch nozzles. The data are consistent with British and CWS data on range. Very striking and extremely promising, however, is the enormous increase in range obtainable by the use of special materials, specifically a starch-water suspension and an incendiary gasoline gel known as Napalm. The latter can be projected three times as far in a one-eighth inch jet as can a conventional hydrocarbon fuel oil. The need for better knowledge of gel structure is emphasized by the profound difference in the range obtainable with two different gels. Table, graphs and drawings are included. The drawings may not reproduce well as the copies in this report are not very clear.

PB 24947. INMAN, G. O. and HANSON, A. C. Properties of recoil oil. (Rock Island Arsenal Lab Rept 39-1775) Nov 1939. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
A study of the action of recoil oil under high pressure reveals that there can be a large difference in viscosity under pressure between two oils which have the same Saybolt viscosity. Of two oils having the same Saybolt viscosity, the one which had the higher viscosity under pressure worked more satisfactorily in the recoil mechanism of a 75 mm. gun. The effect on the oil upon passing it through the high pressure viscosimeter was similar to that of proof firing. The reduction in viscosity after three passes through the viscosimeter was equivalent to that obtained by two rounds of actual firing. Photographs, tables, and a graph are included in this report.

HIGHWAYS AND BRIDGES

PB 23012. BARRY, J. M. Inspection of plants manufacturing the German I-43 military bridge. (CIOS File XXIV-29, Item 20) May 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The complete bridge consisted of approximately 60 parts of which 10 were made at Union Brueckenbau, Dortmund. The following were the principal components produced at Dortmund: Ramps, ramp transoms, ramp connecting links, raft connecting links, heavy transoms, and shore transom. A list of firms manufacturing the remaining elements of the bridge is presented in appendix A. All drawings were reported to have been destroyed prior to the occupation of Dortmund by the American Forces. However, sketches were made from completed and partially completed pieces, with the assistance of the plant's chief engineer. The sketches are shown in appendix B. The parts manufactured by the various plants were shipped to the Panzer Park (Engineer School) Rosenheim, Bavaria, where final assembly into complete bridge units was done by the Army. The specifications for the bridge called for "52" steel, i. e., a chromium alloy steel having a tensile strength of 52 kg./sq.mm.

INSTRUMENTS (PROFESSIONAL, SCIENTIFIC AND CONTROLLING)

German

PB 23085. COLES, J. S. The measurement of air blast from explosion in Germany. (U. S. Naval Tech Mission in Europe Tech Rept 484-45) Oct 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The information in this report was obtained by oral interrogation of Dr. Turetschek. The measurement of air blast from explosions was carried out in Germany mainly at the Technische Akademie der Luftwaffe (TAL) under the direction of Dr. H. Schardin. Charges ranging in size from 500g. to 2000 kg. were tested for various parameters such as power, weight, and distance laws, ease effect, of atmospheric pressure, etc. The report describes very briefly some of the instruments used such as mechanical gauge, piezoelectric gauge and oscilloscope. This accounts for practically all of the important research on air blast carried out in Germany during the war.

PB 22630. MARKS, F., tr. Manufacture of barometer capsule for Rheinmetall-Borsig. (BIOS Halstead Exploiting Centre Rept 508) Oct 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The specifications of the capsule and the materials used are given in this translation of a German document, together with a list of the operations to be performed in the manufacture of the diaphragms and of the capsules. Instructions are also listed for the testing of the capsules. The external diameter of the capsule was not to exceed 35 mm. and the passage was to be 0.17 mm. for 100 millibar = 75mm. Hg. The characteristic of the capsule was to be a straight line. Sufficient pressure was to be maintained in the capsule to insure that the Rheinmetall contact-maker would show a minimum margin of error as regards temperature in the area 750 = 600 mm. Hg. These requirements were met by a capsule which, with a difference in temperature from + 20 to - 40°C., provided a temperature passage of 0.020 to 0.025 mm.

PB 17597. PHOTOS of laboratory equipment. (MIS VII 67b 7000769) Mar 1946. 16 p. Price: Microfilm - 50¢ - Photostat - $1.00
This publication contains photos of German laboratory test equipments and arrangements of groups of equipments. No description is included.

PB 9098. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Ableseverrichtung für logarithmische skalen. (A reading arrangement for logarithmic scales). German patent application T61246 VIII a/21a4 applied for Dec. 7, 1944, and still pending. Original inventor: Dietrich. (Official No. T 61 246 Rept No. 8830) 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9081. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Abstandshalter für konzentrische messleitungen. (Spacers for concentric test lines). German patent application T57 133 VIII b/21c March 24, 1942 still pending. Original inventor: Köhler. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 10858. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Anordnung zur prüfung von muttern, scheiben und dergleichen auf abweichung der endflächen von der senkrechten zur achse (An arrangement to test nuts, washers and similar parts for deviations between the end surfaces and the plane perpendicular to the axis). German patent application T69049 IXb42b applied May 4, 1943 and still pending. Original inventor: Grimm. 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9198. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Bolometer zur bestimmung der leistung von zentimeterwellensendern. (A bolometer to determine the power output of microwave transmitters). German patent application T61060 VIIIa/21a4, Oct 11, 1944, still pending. Original inventor: Dr. Matteré. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 8628. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Einrichtung zur ermittlung der koinzidenz zweier impulsreihen bzw. zur feststellung von deren abweichung nach grösse und richtung (Arrangement for the determination of the coincidence of two impulse series, respectively the measurement of their deviation according to amplitude and direction). German patent 945/42 on application T63873 VIIIa/21a4 dated Mar 28, 1940. Original inventor: Graal. 1940. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10994. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elektrische visiereinrichtung. (Electrical sight arrangement). German patent application T60154 VIIIa/21e applied for Mar 2, 1944 and still pending. Original inventor: Maas. 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Drawing missing.

PB 9170. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Hochfrequenzdurchgangsbolometer, für koaxiale oder hohlrohrleitungen. (A high-frequency bolometer for coaxial lines or wave guides). German patent application T60938 VIII a/21a4 Sept. 16, 1944, still pending. Original inventors: Dr. Koch, Hagedorn, Siol, Heinriche. (Official No. T 60,938 Rept No. 8705) 1944. 4 p. Price: Microfilm- 50¢ - Photostat-$1.00
Illustrations missing.

PB 9182. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Oszillographische anzeigeeinrichtung für den amplitudenvergleich von spannungen. (An oscillographic indicating arrangement for comparing the amplitude of voltages). German patent application T60966 VIII d/21e Sept. 22, 1944, still pending. Original inventor: Dr. Gerhard. 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9184. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Vorrichtung zur strommessung an elektrischen entladungsröhren. (Arrangement for measuring current in electric discharge tubes). German patent application T 61022 VIII a/21a4, Sept. 26, 1944 still pending. Original inventor: Landwehr. (Official No. T 61,022 Rept No 8719) 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9186. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Wellenmesser. (Wave meter). German patent application T 61056 VIII a/21a4, Sept. 27, 1944 still pending. Original inventor: Schütz. (Official No. 61,056 Rept No 8721) 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 10989. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Wellenmessgerät. (Wavemeter). German patent Application T60149 VIIIa/21a4 applied for Feb 28, 1944 and still pending. Original inventor: Brück. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 19881. U. S. ENGINEER BOARD. One German aspiration thermometer and two aspiration psychrometers: Evaluation report. (Registration 3185) Mar 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The aspiration thermometer, Serial No. 188386, consists of a thermometer, thermometer housing, and aspiration mechanism. The thermometer is of the mercury-in-glass type, having a cylindrical glass stem and capillary bore, with the mercury contained in a cylindrical glass bulb at the bottom of the tube. The aspiration device consists of a clock mechanism activated by a main spring and driving a fan. Its unusual design feature is the creation of an air flow over the thermometer bulbs by suction rather than by a direct blowing fan. The use of an aspiration thermometer as such is unknown; however, it can be used as a psychrometer by taking a dry bulb reading, and then inserting a wet wick on the mercury bulb for the wet bulb reading. No equivalent U. S. equipment can be found. The aspiration psychrometers, Serial Nos. 1416909 and 182964 are essentially of the same design, workmanship, and material as the above-described aspiration thermometer, except that they are each modified to contain two identical thermometers of temperature ranges of -5 to 60 C and -30 to 45 C respectively, with the latter an 8-volt electric motor to drive the aspirating mechanism. The Julian P. Friez Instrument Company, a division of Bendix Aviation Corporation, manufactures a motor psychrometer which is the equivalent of this German equipment. Photographs are included.

Japanese

PB 22743. U. S. CAMP COLES SIGNAL LABORATORY. Meteorological receiver, ground, Marines of Navy, Japan, model 97, improvement no. 1. Preliminary report 13. Jun 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes briefly a receiver used by the Japanese Marines or Navy for obtaining intelligence from radiosonde transmitters. It consists basically of a superheterodyne receiver provided with three independent RF tuning systems, all working into a common intermediate frequency amplifier. Photograph of receiver and circuit diagram are included.

United States

PB 27540. BELL TELEPHONE LABORATORIES, NEW YORK. Magnetic air-borne detector, investigation of magnetic noise. (OSRD Rept 2084). Oct 1943. 47 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report states that there are two prominent types of MAD circuits. One can be called the peak type, exemplified by the Mark VI equipment, and one the 2nd harmonic type exemplified by the Mark X. The source of the remnant noise in MAD has been found to reside in the magnetic core material. A method of increasing the signal-to-noise ratio of the 2nd harmonic type of element is described. Experimental evidence is shown which indicates the noise originating in the core is due to the fact that the magnetic material does not follow exactly the same B,H path in successive cycles. During the experimental period leading to the above conclusions the effect on noise of changing various other factors was observed. These factors are: Core material; length, width, and thickness of core; and effects of core; methods of mounting the core; temperature; detecting methods; and circuit details. These experiments are described in this report. Graphs, block diagrams, schematic drawings and sample recordings are included. For later report see OSRD Report 3148 (PB 27541).

PB 27541. BELL TELEPHONE LABORATORIES, NEW YORK. Magnetic air-borne detector investigation of magnetic noise (supplemental report). (OSRD Rept 3148). Jan 1944. 20 p. Price: Microfilm-$1.00 - Photostat-$2.00
The results of the investigation of magnetic noise in magnetic air-borne detectors reported here are supplementary to those contained in an earlier report (OSRD Rept 2084, PB 27540). The overdriven peak type detector and the biased fluxgate detector are described. A noise level of ± 0.03 gamma was obtained with set up to operate at a fundamental frequency of 10 kc. A statement of the principle of operation of the second harmonic system is given in appendix A as well as a description of the circuit and recording technique used for this experiment. Graphs, block diagrams of noise recording circuits, and schematic drawings of power and recorder amplifier circuits are included.

PB 27539. BELL TELEPHONE LABORATORIES, NEW YORK. Magnetic airborne detector, development of a magnetic orienting system. (OSRD Rept 1309) Jan 1943. 72 p. Price: Microfilm - $2.00 - Photostat - $5.00
This report describes a magnetic detection system in which a magnetic detector element is oriented with respect to the earth's field. Changes in the strength of the field of the order of 10 gamma are detected. The system consists of a gimbal type mechanism in which two a-c Servo motors orient a detecting element around mutually perpendicular axes under the control of two fluxgate magnetometers and suitable electronic exciting detecting and control circuits. The drive motors are placed about 2½ feet from the detector and magnetometer elements to avoid magnetic interference. Investigation of various detector and control circuits with particular attention to their operating stability led to the use of a second harmonic heterodyne method for the orienting system in which the exciting frequency, the output frequency and the motor frequency are respectively 500 cycles, 1000 cycles and 166 cycles. The detector circuit is operated on a second harmonic basis but with an exciting frequency of 800 cycles and hence an output frequency of 1600 cycles thus avoiding interaction effects with the orienting circuits. A working model was constructed and subjected to limited laboratory and field tests. Orientation within 1/4 degree at an angular speed of 20 degrees per second was obtained in the laboratory and somewhat less in the field. Combined detector noise and parasitic signal assignable to the orienting system amounted to 5 gamma or less. This performance does not give as great a range of submarine detection as is desirable and suggestions for improving the system in this respect are included. Photographs, graphs, table and schematic drawings are also included.

PB 20288. BERRY, RICHARD N. and others. A system of automatic devices for the detection and recording of errors in a 105 mm Howitzer battery. (OSRD Rept 5313; NDRC Applied Psychology Panel Rept 571; Project SCS-11, Rept 5) Jul 1945. 22 p. Price: Microfilm - 50¢ - Photostat - $2.00
The devices described in this paper consist of a set of Sound Scribers, by means of which verbal commands transmitted to gunners are recorded on wax discs, and a set of remote indicating devices, by means of which scale settings on the range quadrants, scale settings on the panoramic telescopes, and actual directions and elevations of the howitzer tubes could be known at all times. They were designed in connection with a general investigation of psychological factors in the operation and design of field artillery sighting equipment. Photographs and a schematic diagram are attached. The research was done under contract by Tufts College, Medford, Mass.

PB 27543. COLUMBIA UNIVERSITY. AIRBORNE INSTRUMENTS LABORATORY. AN/ASQ-1 magnetic airborne detection equipment. (OSRD Rept 2035) Oct 1943. 59 p. Price: Microfilm - $2.00 - Photostat - $4.00
Subject equipment is a sensitive stabilized recording magnetometer designed for installation in aircraft. The equipment is used to locate submerged submarines by detecting the small local changes produced by the submarines in the magnetic field of the earth. The normal range of detection varies from 400 to 700 feet. AN/ASQ-1 is a single frequency system, i.e., the detector element, the stabilizer elements, and the servo-motors are all supplied with power at a single frequency which originates in the master oscillator. The output of this oscillator is a remarkably pure sinusoidal voltage at a stabilized frequency of 400 cycles per second. Descriptions, with photographs, of the individual units are given. Performance characteristics of the detector and stabilizer systems are discussed, as well as use over wide range of magnetic latitude. Illustrations show signals recorded by subject equipment above a submerged submarine. Photographs, graphs, and a table are also included.

PB 27549. COLUMBIA UNIVERSITY. AIRBORNE INSTRUMENTS LABORATORY. Handbook of instructions for AM-36/ASQ. (OSRD Rept 4186) Sep 1944. 18 p. Price: Microfilm-$1.00 - Photostat-$2.00
This device has been developed to overcome spurious indications in the magnetic airborne detector produced by magnetic fields produced by eddy currents in the wings. The AM-36 unit is a three-stage band-pass amplifier employing degenerative feedback. The input to the amplifier is the voltage picked up by a coil placed in the airplane in such a position that the radial plane of the coil is parallel to the eddy-current loop. The amplifier output is connected to a compensating coil which, when proper adjustments are made, produces a magnetic field which is equal and of opposite phase to the field produced by the eddy currents at the detector. The unit contains 4 vacuum tubes and requires approximately 10 milliamperes at 300 volts and 480 milliamperes at 28 volts. The handbook contains sections on principles of operation, physical data, adjustment, gain-test, voltage, resistance and capacitance measurements. Photographs, circuit diagram, parts layout and table of replaceable parts are included.

PB 27553. COLUMBIA UNIVERSITY. AIRBORNE INSTRUMENTS LABORATORY. Magnetometer suspensions. (OSRD Rept 5061) May 1945. 28 p. Price: Microfilm-$1.00 - Photostat-$2.00
Successful operation of the Magnetic Airborne Detector requires accurate and continuous alignment of a magnetometer element with the direction of the magnetic field of the earth. To attain this alignment during aircraft flight, the arrangement of the element must allow movement that counteracts manouvers of the aircraft and variations in dip angle as the latitude of operation changes. The development of such an arrangement is discussed in this report. Three systems of two-axis mountings are described - all with serious limitations when used in latitudes other than those for which the mounting was designed. This led to the design of the "Universal Head" with three axes of freedom, permitting operation in any magnetic latitude. The design and mechanical components are explained and illustrated. Graphs, drawings and tables are included. See also PB 27546, 27547.

PB 27554. COLUMBIA UNIVERSITY. AIRBORNE INSTRUMENTS LABORATORY. Saturated-core magnetometers, MA-120. (OSRD Rept 5314). May 1945. 40 p. Price: Microfilm-$1.00-Photostat-$3.00
The saturated-core magnetometer consists of a coil wound around a strip of ferromagnetic material of high permeability. In use, a pair of magnetometers are coupled by a bridge in such a way that the magnetic fields within the coils have opposite poles. Following the description of the bridge, this report is divided into four parts in which are discussed some of the fundamental research and calculations conducted at The Airborne Instruments Laboratory as part of the MAD program. Part I by W. H. Brattain is a study of the behavior of the magnetometer under various conditions of drive, configuration, material and field. It includes the results of research on the magnetometer operating as an isolated detector. Part II, also by Mr. Brattain, is concerned with the operation of the magnetometer as it depends upon the impedance unbalance within the bridge with which the magnetometer is used. Part III,

by A. C. Weid is a statistical study of the variations in Permalloy strips of varying sizes. Part IV by K. S. Packard is an investigation into the sources of noise in the magnetic detection equipment. Graphs, diagrams, and a bibliography are included.

PB 27552. COLUMBIA UNIVERSITY. AIRBORNE INSTRUMENTS LABORATORY. A study of short-time fluctuations in the magnetic field of the earth, Project NA-120. (OSRD Rept 4790) Feb 1945. 20 p. Price: Microfilm-$1.00 - Photostat-$2.00
In any work in which the magnetic field of the earth must be taken into consideration, any variation in that field is of potential significance. For that reason, a study of short-time fluctuations in the magnetic field of the earth, particularly those in a frequency range from 0.1 to 1.0 cycle per second, was begun at Airborne Instruments Laboratory in the fall of 1942. The progress of that work, the improvement in methods and equipment for studying these fluctuations, and the results observed before the Laboratory's share in the project was completed, are discussed briefly in this report. Photographs, graphs and circuit diagram are included.

PB 4372. DIMMICK, R. C. Humidity test of indicator regulator M1. (Frankford Arsenal Fire Control Eng Rept 776) Nov 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Four indicator regulators were tested to determine the amount of desiccant required to keep the humidity inside the M1 indicator regulator below 60% for given lengths of time. Hygrometers inside the units were used for humidity readings. The temperature inside the test cabinet was cycled once a day through an average range of 23° F. The test results were as follows: (1) The interior in its present semi-sealed condition reaches the exterior humidity in 48 hours; (2) a dry weight of 100 grams of silica gel will keep the interior below 60% R. H. for twelve days; (3) the average rate of increase of humidity inside the desiccated indicator regulators was 2.3% per day. Results of tests are shown graphically.

PB 22157. EASTES, JOHN W. and MACY, R. Thickened vesicants, development of a field viscometer. (CWS Tech Div Memo Rept 579) Mar 1943. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
The field viscometer M1 is suitable for field use in the determination of the viscosity of thickened vesicants because of its simplicity in operation and cleaning, and yields data which are in agreement with data obtained by means of the capillary-type viscometers universally recognized as reliable for measurement of viscous flow. Glossary, experimental data, tables, and diagram are included.

PB 27550. GULF RESEARCH AND DEVELOPMENT COMPANY, PITTSBURGH, PENNSYLVANIA. Application of sensitive magnetic devices to detection of submarines from aircraft. Final report, Jul. 1, 1942. (OSRD Rept 1870) Sep 1943. 16 p. Price: Microfilm-$1.00 - Photostat-$2.00
This final report covers in outline the work done at the Gulf Laboratories on the aircraft magnetometer under contract OEMsr-27 which expired June 30, 1943. The report includes the history of development prior to present contract, and work under present contract. This includes a description of the vertically-stabilized instrument which was built according to specifications at the Sperry Gyroscope Company, and which consisted of an aluminum housing containing a gyro horizon and a saturated core magnetometer mounted on the gyroscope with its axis parallel to the spin axis of the gyroscope. A résumé is given of the development of the (MAD) Mark I and II, the fully magnetic stabilization control, and the Mark IV and V magnetometers. Photographs and a circuit diagram for (MAD) Mark II magnetometer are included.

PB 20287. HUDSON, BRADFORD B. and SEARLE, LLOYD V. Description of the Tufts tracking trainer. (OSRD Rept 3286; NDRC Applied Psychology Panel Rept 168; Project NDC-6, Rept 11) Feb 1944. 20 p. Price: Microfilm - 50¢ - Photostat - $2.00
This report describes a tracking trainer built as an experimental instrument for studying antiaircraft tracking problems which occur in the operation of the Army Director, M7 (or M9). It is similar in external appearance and general dimensions to the Director, and duplicates those characteristics which are essential to the tracking operations, e.g., positions of handwheels and eyepieces, handwheel ratios and torque, rotation of instrument case and telescopes, etc. An ink-recorder and clock score provide immediately available measures of performance, that are useful from an instructional and a research point of view. The research was done under contract by Tufts College. Photographs and diagrams are included.

PB 23126. LUTTS, C. G. and CUOZZO, DANTE. New design of elastic proving bar. n. d. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
A proving bar employing a unique feature for measuring elastic movement has been designed and tested at the Boston Naval Shipyard. Heretofore, with proving bars, elastic movement has been measured at the surface of the bar. With the present bar, measurements are made along the central axis and thereby much greater accuracy and simplicity is afforded as compared to measurements made along the surface. The proving bar described in this report was designed to eliminate the necessity of using surface measurement. One measurement made at the axis of the bar was found to serve for four or more surface measurements. A bar affording a capacity of 500,000 pounds was chosen for the initial manufacture. Information regarding the design, calibration, and operation of this bar and surface readings versus axial readings is given. A photograph, drawings and calibration curve are included.

PB 27555. MEAD, JUDSON and others. Reports on the towed birdie. Apr 1943. 41 p. Price: Microfilm-$1.00 - Photostat-$3.00
"Towed birdie" is the name used to designate a streamlined housing for magnetic airborne detector equipment which is towed from an airplane during flight. The object of this suspension is to remove the MAD equipment as far as possible from the magnetic influence of the airplane. A historical account is given of the designing and testing of the birdie, or fish as it was first called, during level flight and in simulated rough air. A description is given of the birdie and its mounting, and the designing of a damper that would control rolling. Photographs, tables and curves are included.

PB 23765. NATIONAL RESEARCH CORPORATION. Air conditioning as a means of eliminating fog and frost formation on glass surfaces in optical instruments. (OSRD Rept 932) Oct 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The U. S. Navy during dive-bombing operations in the Southwest Pacific area encountered serious fogging in the telescopic sight in use in dive bombers. The fogging of the sight occurred during the dive and was caused by moisture from the warm lower air condensing on the several lenses in the sight which were previously cooled by the cold upper air. Due to the construction of this instrument, it is extremely difficult to make a permanent air-tight seal. It was decided, therefore, to seal the sight as well as possible with rubber cement and to fit it with a drying tube, using silica gel as a drying agent. The dryer was, in turn, fitted with a valve which admitted air only under pressure differentials greater than 8 mm, and allowed air to escape only under pressure differentials greater than 3 mm. The use of such a combination of dryer and valve is not limited to this specific telescopic sight but may be employed on any optical instrument, double windshield, etc. that is subjected to large pressure variations; especially on those instruments which cannot be completely sealed because of the possibility that the pressures developed might injure the instrument.

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PB 27543. PETERSON, R. A. Origin and reduction of maneuver noise in MAD equipped aircraft. (OSRD Rept 1348). Mar 1943. 30 p. Price: Microfilm-$1.00 - Photostat-$2.00
This report states that maneuver noise in the magnetic airborne detector may be caused by a combination of the following factors: (1) Magnetic fields produced by the magnetization of iron parts in the plane; (2) eddy current fields generated by motion of the ship in the earth's magnetic field; (3) translation of the MAD detector through regional gradients in the earth's magnetic field during turns; (4) imperfect operation of the orientation or stabiliser systems. These factors are discussed. The principal practical conclusions to be drawn from the data in this report are: (1) Whenever possible, installation positions in aircraft having as small ferromagnetic fields as possible should be chosen; (2) the most profitable field for efforts in reducing maneuver noise is the compensation of permanent magnetic fields by methods similar to those described in this report. Considerable improvement in performance may be expected from carefully performed compensation operations. Graphs of flight, noise records, and isometric views are included. This work was done at the Airborne Instruments Laboratory, Columbia University. See also the report of this laboratory dated July 1944, PB 27551.

PB 27545. RICHARDSON, M. S. and WEID, A. C. Analysis of operation of the universal magnetometer head. (OSRD Rept 1776). Aug 1943. 56 p. Price: Microfilm-$2.00 - Photostat-$4.00
This memorandum examines the theoretically permissible maneuvers and regions of operation of a universal magnetometer head for the magnetic airborne detector developed at the Airborne Instruments Laboratory. It treats idealized forms of two types of proposed operation by examining first the operation for zero pitch and then determining the additional limitations imposed by dive or climb. The discussion in this paper is limited to the case where the apparatus is connected for northern hemisphere operation with the magnetometer head forward of its motors. Operation in the northern and southern hemispheres with the proper connections can be shown to be symmetrical. The report includes a diagram of the universal head and several graphs. See also PB 27546 and PB 27547.

PB 27546. RICHARDSON, M. S. and WEID, A. C. A general type of operation of the universal magnetometer head. (OSRD Rept 1928) Sep 1943. 35 p. Price: Microfilm-$1.00 - Photostat-$3.00
The universal head is a three axis system of gimbal for mounting magnetometer elements of the magnetic airborne detector that will permit three degrees of rotational freedom. This report is a theoretical inspection of the limitations on the maneuvers of the airplane imposed by this type of magnetometer support. Actual operating ranges are calculated for assumed approximate axis limits. Curves and tables of limits are worked out.

PB 27547. RICHARDSON, M. S. and WEID, A. C. Operation of the universal magnetometer head with linear non-ideal control mechanism. (OSRD Rept 1930). Sep 1943. 13 p. Price: Microfilm-$1.00 - Photostat-$1.00
This report discusses methods of determining the permissible operating regions for the universal magnetometer head for certain types of control mechanisms. The universal head is a gimbal system with three degrees of rotational freedom, but each rotation is limited in amount. According to the report, in the case of a mechanism such as this which is subject to an error which is a linear function of the A axis rotation, it is necessary to make only two measurements in the theoretical determination of the corrections of the limitations of the operating range derived on the basis of an ideal control mechanism. The corrections define the widest range within which a control mechanism of this type will surely operate, but do not exclude other areas in which it may possibly operate satisfactorily. Curves are given. See also PB 27545 and PB 27546.

PB 27566. SMITH, P. H. The towed bird, mechanical details. Feb 1944. 32 p. Price: Microfilm-$1.00 - Photostat-$3.00
The design of the towed bird of the magnetic airborne detector has been made aerodynamically stable by the addition of a tail of sufficient size and accuracy of construction and by proper suspension at the center of gravity of the streamlined housing. The design of the parallelogram bail which is used for the attachment to the cable reduces the transfer of motion from the cable to the bird and permits two degrees of freedom, pitch and roll. Specifications and design drawings for the various components of the bird are given. Photographs taken in flight show the extreme positions assumed by the bird during flight maneuvers as well as its relation to the airplane during normal operation. This report was prepared at the Airborne Instruments Laboratory of Columbia University.

PB 27548. TOLLES, W. E. Compensation of induced magnetic fields in MAD equipped aircraft. (OSRD Rept 1386). Apr 1943. 19 p. Price: Microfilm-$1.00 - Photostat-$2.00
This report presents the theoretical basis of a procedure for compensation of the induced magnetic fields in MAD equipped aircraft. Preliminary practical trials have yielded results consistent with this theory. Results of flight tests of this compensation procedure will be presented in a later report (see PB 27544).

PB 27551. TOLLES, W. E. and VACQUIER, V. V. Compensation of magnetic fields in MAD-equipped aircraft. (OSRD Rept 4187) Jul 1944. 87 p. Price: Microfilm - $2.00 - Photostat - $6.00
This report comprises research on the elimination of spurious magnetic indications caused by ferro-magnetic members of the aircraft or by magnetic fields set up by eddy currents generated in the conducting structures of the aircraft by the maneuvers of the aircraft. These spurious signals may mask the signals from the target. Therefore experience, research and theoretical discussions are combined to work out a plan of compensation. Problems involved in the location of the magnetic airborne detector head in the plane are examined. Flight maneuvers for testing compensation, the separation of the magnetic components of the disturbing field, and compensation procedure are discussed in turn. A section on the derivation of fundamental equations and working formulae is included. Appendices describe the calculation of induced compensation and of eddy-current ring compensators. Another appendix describes the adjustable perm compensator in some detail. Also discussed in appendices are: Direct-coupled amplifiers, ground measurements, electronic compensator for induced magnetic fields and maneuver monitor, electronic compensator for eddy-current fields, and service compensations. This report contains a photograph, drawings and many graphs. The report was prepared at the Airborne Instruments Laboratory of Columbia University. See also PB 27542 and PB 27548.

PB 23044. U. S. BUREAU OF MEDICINE AND SURGERY. A report on the test-retest reliability of the Admiralty Mark I adaptometer. (Project X-138, Enclosure A) n. d. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests at the U. S. Submarine Base, New London, Conn., by W. S. Verplanck and Mrs. D. T. Reed are described. Results indicate that the reliability of scores on the Admiralty Mark I adaptometer made by the 27 subjects tested is somewhat lower than that of those made by comparable subjects on other adaptometers, though higher than British population on which it was standardized. Graphs are included.

PB 23048. U. S. BUREAU OF MEDICINE AND SURGERY. A report on the test-retest reliability of the Wright adaptometer. (Project X-137, Enclosure B) n. d. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report on the test-retest reliability of the Wright adaptometer indicates that this instrument is unacceptable though extremely easy to use. The distribution of test and retest scores is shown in a graph.

PB 22248. U. S. WAR DEPARTMENT. A. F. and R. F. signal generator, supreme models 561 and 561M. (Tech Manual 11-2674) Sep 1945. 70 p. Price: Microfilm-$1.00 - Photostat-$5.00
The a.f. and r.f. signal generator described in this manual is a combination signal generator incorporating an audio-frequency oscillator with a frequency range of 15 to 15,000 cycles per second, and a radio-frequency oscillator with a frequency range of 65 kilocycles to 20.5 megacycles. The r-f oscillator can be amplitude modulated by the self contained a-f oscillator, or it can be frequency modulated by a modulator which is part of the equipment. The signal generator is designed for use by repairmen in testing and repairing radio receivers and other similar electronic equipment. Instructions are given for operation, maintenance, and repair. Labeled photographs, block diagrams, and schematics illustrate the text.

PB 22231. U. S. WAR DEPARTMENT. Cabinet BE-70-A, -B, -C, -D, -E, -F, -G, -H, -J, -K, -L, -M, -N, -P, -Q, -R, -S, -U, -AA, and -AB; wire chief's testing. (Tech Manual 11-345) Jul 1945. 75 p. Price: Microfilm-$1.00 - Photostat-$5.00
Cabinet BE-70 is a wire chief's compact test desk, which affords a means of identifying and localising faults common to both magneto and common battery telephone central offices. The test cabinet consists of a wooden cabinet, a voltmeter, key switches, terminals, retardation coil, induction coil and capacitor, alternating current buzzer, and hand generator for supplying ringing current. The various models of this set are described and instructions are given for installation, operation, maintenance, and repair of the equipment. Photographs and circuit diagrams illustrate the text.

PB 23453. U. S. WAR DEPARTMENT. Calibrator I-189-A. (Tech Manual 11-1227) May 17, 1945. 40 p.
Available from the Supt of Docs, Washington 25, D. C. Price: 15¢
Calibrator I-189-A, described in this instruction manual, is a range calibrator for pulse-triggered range oscilloscopes. The oscilloscope sweep is triggered at approximately 480 cycles per second and the range is calibrated by direct comparison with 500-yard calibration markers. The unit is a portable, self-contained instrument, containing a crystal-controlled 327.80 kc oscillator. Two coaxial cables are also provided. Various diagrams and photographs are included.

PB 23662. U. S. WAR DEPARTMENT. Capacitor analyser, Solar model CB-1-60. (Tech Manual 11-2658) Feb 1945. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This capacitor analyzer accurately determines the important electrical characteristics of all types of electrolytic, paper, mica, trimmer and air condensers. Condensers may be tested for capacity, leakage, opens, shorts, intermittent operation, and power factor with this equipment. Accurately calibrated markings on several color-coded scales are provided for convenient measurement of capacity and resistance. These tests are made on a Wien bridge with five direct reading ranges on the Model CB and six ranges on the CC model. The power factor of electrolytic condensers can be read directly from a scale which is calibrated zero to 50% power factor. The capacity range of the Model CB is from .0001 mid. to 70 mid. and the resistance range is from 50 ohms to 2,000,000 ohms. The leakage test part of the equipment consists of a D.C. power supply and a Neon lamp. Operating instructions are given for tests on all types of condensers. Drawings, photographs, and circuit diagrams accompany the instructions. Supplementary data is given on moistureproofing and fungiproofing this equipment. This instrument can be operated from power lines rated at 120, 165 or 240 volts, 25 to 60 cycles.

PB 23658. U. S. WAR DEPARTMENT. Fluxmeters TS-15/AP, TS-15-A/AP, and TS-15B/AP. (Tech Manual 11-2569) Dec 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
The series of Fluxmeters TS-15/AP, TS-15A/AP, and TS-15B/AP is designed to provide qualitative measurements of the flux densities in magnets used in oscillatory circuits of X-band and S-band radar transmitters. A gauss meter and a probe meter are used in the operation of the instrument. The characteristics of each of the three fluxmeters are separately described, and information for installation, operation, and maintenance is presented with photographs, diagrams, and tables.

PB 23660. U. S. WAR DEPARTMENT. Frequency meter BC-906-E. (Tech Manual 11-2623) Jul 1944. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This model is an absorption-type frequency meter powered by batteries. The instrument is used to determine the frequency of r-f signals and to calibrate radio equipment. The meter mounted on the front panel may be used independently as a microammeter. When used as a frequency meter, the set is accurate within 0.5 megacycles. The frequency range of this frequency meter is from 150 to 234 megacycles. Mounted on the front panel is a friction vernier-drive dial equipped with a vernier attachment which enables a scale reading to be taken in tenths of a division. The antenna consists of three sections and is 20 inches in length extended, and 8-3/8 inches in length when collapsed. Further descriptions are given, also instructions for operation and maintenance. Photographs, schematic, voltage and resistance diagrams, and a list of parts are included.

PB 22021. U. S. WAR DEPARTMENT. Instruction book for weather panel ML-143-A, ML-143-B, ML-143-C, ML-143-D; wind recorder ML-144-A, ML-144-B, ML-144-C, ML-144-D; wind intensity transmitter ML-151-A, ML-151-B, ML-151-C, ML-151-D; wind direction transmitter ML-152-A, ML-152-B, ML-152-C, ML-152-D; weather panel ML-173; wind recorder ML-174; weather panel ML-183-A, ML-183-B. (Tech Manual 11-2414) Jan 1943. 71 p. Price: Microfilm-$1.00 - Photostat-$5.00
This instruction book contains a detailed description of the components of the wind indicating system listed in the title. It also contains complete instructions for the installation, operation, adjustment, maintenance, and repair of this equipment. Photographs, drawings and circuit diagrams are grouped at the back of the book. The manufacturer is Julien P. Friez and Sons Division of Bendix Aviation Corporation.

PB 23406. U. S. WAR DEPARTMENT. Ordnance maintenance: Depression position finder M1. (Tech Manual 9-1695) Nov 21, 1941. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This depression position finder M1 is an instrument used for measuring from heights above sea level, between limits of 14 to 1,395 feet and 2,850 to 4,100 feet, the true horizontal range of an object on the surface of the sea and also the azimuth of the object from the azimuth reference line. The instrument consists essentially of a telescope, mount, and pedestal. When the telescope is directed on the water line of a target the depression angle is measured mechanically, and the corresponding horizontal range, corrected for curvature of the earth and normal atmospheric refraction, is read directly on a range scale graduated in yards. Internal correction adjustments compensate for tidal variations, abnormal atmospheric refraction, and for heights of instrument other than those for which the range scale is calibrated. Azimuths are read directly from an azimuth scale and micrometer. Description of the component parts and their operation, and instructions for inspection, maintenance and repair are given. Detailed drawings are included.

PB 23656. U. S. WAR DEPARTMENT. Oscillator I-151-A. (Tech Manual 11-2524) Oct 1944. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
An audio oscillator is a device for producing a signal of predetermined frequency which may be used for various tests in electronic equipment. This unit is an audio-frequency oscillator operating from an a-c line of 110-120 volts at

60 cycles. Its output covers the frequency range of from 20 cycles to 20,000 cycles in 3 bands. Instructions are given for the operation and maintenance of the subject equipment, and photographs and diagrams illustrate the text. A table of maintenance parts is appended.

PB 23501. U. S. WAR DEPARTMENT. Signal generator I-122-A. (Tech Manual 11-1039) Apr 21, 1943. 24 p. Price: Microfilm - 50¢ - Photostat - $2.00
Signal generator I-122 consists of a 2-band radio frequency oscillator, covering the range of from 15 MC to 25 MC and 90 MC to 125 MC; a modulator; a calibrated R.F. attenuator; a vacuum tube voltmeter to set the attenuator level; and a voltage regulated power supply. This manual contains information on the installation, operation and maintenance of the equipment. Photographs and diagrams illustrate the text.

PB 23478. U. S. WAR DEPARTMENT. Signal generator I-208. (Tech Manual 11-317) Aug 1943. 66 p. $1.00 - Photostat-$5.00
The signal generator I-208 is a frequency and voltage standard for testing frequency modulation radio equipment. It is used in the calibration, alignment, and determination of sensitivity of frequency modulation radio receivers, and may be installed on Mounting FT-237 for use in mobile units or for field use. The signal generator covers two frequency ranges: 1.9 to 4.5 mc. and 19 to 45 mc. Instructions for the installation, operation, functioning of parts, and maintenance are given, with diagrams and photographs illustrating the text. Tables present data.

PB 23508. U. S. WAR DEPARTMENT. Signal generator I-222-A. (Tech Manual 11-1082) Jul 15, 1944. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This operation and maintenance manual covers a combination signal generator and heterodyne type wavemeter. It is used to check the frequency of radio equipment. The frequency coverage on the low-frequency range setting is from 8 to 15 mc, while the high frequency range coil gives a coverage of from 135 to 230 mc. Photographs and diagrams are included.

PB 21937. U. S. WAR DEPARTMENT. Signal generator TS-155B/UP (Tech Manual 11-2657B) Apr 19, 1945. 70 p. Price: Microfilm - $1.00 - Photostat - $5.00
Signal generator TS-155B/UP is a generator of pulse-modulated, calibrated, radio-frequency signals, used for testing the operation of radar sets in the frequency band, 2700 to 2900 mc. As a signal generator, it measures or checks the sensitivity of the radar receiver; as an r-f wattmeter, it measures or checks the power output of the radar transmitter. This instruction manual is illustrated with photographs and diagrams.

PB 22237. U. S. WAR DEPARTMENT. Signal generator TS-343/U. (Tech Manual 11-1233) Feb 24, 1945. 46 p. Price: Microfilm - 50¢ - Photostat - $4.00
The generator described in this instruction manual is a precision instrument designed to provide a source of continuous-wave, radio-frequency oscillations in two frequency ranges, 15 to 28 mc and 27 to 50 mc. These r-f oscillations can be modulated as required with either 400 or 5200 cycles by means of a rotary switch. The instrument can be operated from any 115/120-volt, 25/60-cycle, a-c power source. The principal use of the signal generator is for the alignment of radio receivers. The instrument can also be used to provide a signal, when used in conjunction with a suitable output indicator, in trouble shooting a defective receiver. Photographs and diagrams are included.

PB 21893. U. S. WAR DEPARTMENT. Signal generators TS-155/UP and TS-155A/UP. (Tech. Manual 11-2657) Feb 8, 1945. 72 p. Price: Microfilm - $1.00 - Photostat - $5.00
This operating and maintenance manual describes a generator of pulse-modulated, calibrated, radio-frequency signals. It is used for testing the operation of radar sets in the frequency range from 2700 to 2900 mc. As a signal generator it measures or checks the sensitivity of the radar receiver; as an r-f wattmeter it measures or checks the power output of the radar transmitter. Photographs, schematic and circuit diagrams are included.

PB 23507. U. S. WAR DEPARTMENT. Test set AN/GPM-1. (Tech Manual 11-1080) Oct 31, 1944. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
This is the basic test equipment for all ground radar and IFF radio sets. It consists of the instruments and cords necessary for general third echelon maintenance. The instruments are carried on a shock-mounted rack of a truck, and a power unit is carried by trailer. The principal instruments at a circuit analyzer, oscilloscope, tube tester, oscillator, signal generator, and volt-ohmmeter. Full details for installation and operation of the various instruments are covered by individual technical manuals. Drawings and photographs are included.

PB 22056. U. S. WAR DEPARTMENT. Test set I-49. (Tech Manual 11-2019) Aug 12, 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
This test set is a compact, sturdy, portable Wheatstone bridge designed for use in central office trouble - locating desks to determine the location of faults in wire lines. This equipment which was designed for use in the field is rapid in operation, light in weight, and small in size. The manual gives instructions for installations, operation, and maintenance of the equipment. Photographs, diagrams, tables, and schematics illustrate the text.

PB 23661. U. S. WAR DEPARTMENT. Test unit I-176. (Tech Manual 11-2636) Jul 1944. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
This test unit is designed to measure resistance, alternating current, direct current, and voltage over a wide range of values. There are five alternating-voltage ranges, all having a sensitivity of 1,000 ohms per volt, and five direct voltage ranges, providing a choice of either 1,000 or 20,000 ohms per volt sensitivity. An additional high-voltage range of 0 to 5,000 volts has a sensitivity of 20,000 ohms per volt. Alternating-current measurements can be made in four ranges and direct-current measurements can be made in seven ranges. The three ranges provided for resistance measurements are 0 to 1,000 ohms, 0 to 100,000 ohms, and 0 to 10,000,000 ohms. All ranges employ a constant-resistance ohmmeter circuit, with a 1.5-volt internal battery for the two lower ranges and a 22.5-volt internal battery for the highest range. The functioning of the various circuits are described and instructions are given for operation, servicing, maintenance, moistureproofing and fungiproofing. Supplementary data include a tube-base chart for Signal Corps and commercial tubes, color codes, and a maintenance parts list. Photographs, drawings and wiring diagrams are included.

PB 22256. U. S. WAR DEPARTMENT. Voltmeter I5-189. (Tech Manual 11-1244) Mar 22, 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
The voltmeter described in this manual is a combination test instrument designed to measure a-c and d-c voltage, d-c current, resistance, and power in decibels. It provides 20,000-ohm-per-volt sensitivity for d-c measurements and 1,000-ohm-per-volt sensitivity for a-c measurements. The manual contains instructions for operation, maintenance, and repair of the equipment. Diagrams and photographs illustrate the manual. The appendix contains a list of maintenance parts.

PB 21968. U. S. WAR DEPARTMENT. SIGNAL CORPS. Frequency standard TS-65A/FMQ-1. (Tech Manual 11-2602A) Jan 1945. 44 p. Price: Microfilm-50¢ - Photostat-$3.00

This manual describes this equipment used to align and calibrate Frequency Meter TS-29/FMQ-1 and Radiosonde Recorder RO-3/FMQ-1 (components of Radiosonde Receptor AN/FMQ-1) and functioning of its parts. Installation and operation and maintenance instructions are given. It is accurate to one part in 20,000 at temperatures between + 40° C. and 0° C. It generates standard audio frequencies over the range from 10 to 190 cps by means of three electrically driven tuning forks, which are temperature compensated and pressure sealed. Each of the three tuning forks controls a resistance-capacitance multivibrator tuned to a submultiple of the tuning fork frequency. Requires a power supply of 115-volt, 50- to 60-cycle A-C. Photographs, circuit and schematic diagrams included.

PB 21184. U. S. WAR DEPARTMENT. SIGNAL CORPS. Operating instructions for radiosondes AN/AMQ-1, AN/AMQ-1A, AN/AMQ-1C, and radiosonde receptor AN/FMQ-1. (Tech Manual 11-2404) Dec 1944. 58 p. Available from Superintendent of Documents., Washington 25, D. C., price 25¢.
The radiosonde is a meteorological instrument combined with a miniature transmitter, carried aloft by a balloon to transmit radio signals from which may be determined the pressure, temperature, and relative humidity encountered to a height of approximately 12 miles. When the balloon bursts, the radiosonde descends slowly by means of an attached parachute. It is used to forecast weather for airplane flights, troop movements, artillery fire, and chemical warfare. The receptor, or ground station receives and records the transmitted signals. The transmitter is a modulated oscillator emitting intermittent CW at a range of 68 to 70 mc. Photographs, drawings, and diagrams are included.

PB 21945. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test set I-181. (Tech Manual 11-2036) Aug 1944. 35 p. Price: Microfilm - 50¢ - Photostat - $3.00
This manual covers installation and operation, functioning of parts and maintenance of this current-flow type relay adjusting set, particularly adapted for use with smaller installations of communications equipments, where simplicity of operation and portability are considerations. Its primary function is to measure and control the amount of current flow through the winding of a relay, drop, or similar electromagnetic apparatus. It may also be used as a d-c milliammeter over 3 meter scale ranges of 0-15, 0-75 and 0-150 milliamperes. Parts list, photographs, schematic and wiring diagrams are included.

PB 27587. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT, and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for AN/ASQ-3 testing systems. (AN 16-30ASQ3-3) Jan 1944. 160 p. Price: Microfilm-$4.00 - Photostat-$11.00
A description of the components and operation of the AN/ASQ-3 equipment for the magnetic detection of submarines from aircraft is presented in this handbook. Brief instructions are also given for installation, adjustment, and operation, and full instructions for the maintenance of the equipment and its component units. A section on the mechanical and electrical characteristics of the equipment describes its theory and functioning. Labeled photographs, tables, diagrams, schematics, assembly drawings and parts lists are included.

PB 27560. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for AN/ASQ-3A equipment. (00-AN-08-20-14) Jun 1944. 193 p. Price: Microfilm - $4.00 - Photostat - $13.00
This handbook contains general and detailed descriptions of the arrangement, theory, and functioning of the AN/ASQ-3A equipment for the magnetic detection of submarines from airplanes. The equipment consists of several units connected together and to the power supply of the aircraft by cables. Some of the equipment is installed permanently in the airplane at the factory and the portable units are installed at the operating base. Instructions are included for installing, operating and maintaining the equipment and its component parts. Illustrations show the appearance of the units and the locations of controls. Photographs, diagrams, schematics, tables, and parts lists are included.

PB 27544. VACQUIER, V. and TOLLES, W. Compensation of AN/ASQ-2 installation in Army B-18 bomber no. 7470. (OSRD Rept 1997) Nov 1943. 29 p. Price: Microfilm - $1.00 - Photostat - $2.00
This report states that magnetic compensation of a B-18 wingtip installation was accomplished with copper rings, permalloy strips, and permanent magnets. The compensation procedure consisted in rolling the airplane at different frequencies and recording the noise generated by these maneuvers with a d-c amplifier. Since the method used for compensating the B-18 is novel, the procedure which was followed is set forth step by step. A survey of the magnetic field at possible detector locations made by moving the airplane away from a stationary magnetometer, is very helpful in determining the best spot. When the location has been selected, the survey should indicate the major components that require compensation. Other reports on this subject are: PB 27542, PB 27551 and PB 27545. Graphs and a drawing are included. This work was done at the Airborne Instruments Laboratory, Columbia University.

PB 23080. VERPLANCK, W. S. Comparative study of adaptometers. (Bur of Medicine and Surgery Project X-68) Dec 1942. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
An extensive experimental test was on the following adaptometers: N.D.R.C. model II-A, self-luminous telesilhouette, and Hecht-Shlaer adaptometer, as revised at the U. S. Submarine Base, New London, Connecticut. The data obtained permit comparison of the three instruments with respect to test-retest reliability, and for the first time clearly indicate the amount of variability which might be expected in the night vision of the individual. Intercorrelation among the instruments are presented. Tables, graphs and blueprints of general layout of Night Vision Testing Laboratory are included.

PB 23536. WACKNITZ, MARGARET, tr. Description and instructions for use of motor drive KM 18 and KM 30 and of the Universal impulse regulator IRU; edited by Emilia Wilder. (AAF ATSC T-2 Translation 506) Mar 1946. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The electromotive drive with the coupling motor KM 18 or KM 30 and the Universal impulse regulator IRU serves for a wholly automatic operation of serial cameras and is equally suited for close and remote control of the same. The drive mechanism consists of (1) the coupling motor with an attached reduction gear which can be magnetically coupled (2) the Universal impulse regulator which comprises an exposure interval regulator, a drift meter, an impulse transmitter and a control board (3) a dynamic pressure blower, and (4) a storage container with inlets for all the parts. This translation of the German work, Beschreibung und Gebrauchsanweisung für den Motorantrieb KM 18 bzw. KM 30 und Universalimpulsregler IRV, includes purpose and construction of the drive mechanism, description of parts, instructions for installation, working principle and operation, and care and maintenance. Drawings of parts and an index are included.

PB 20291. WEISS, H. K. Tracer stereographs with vertical base line. (OSRD Rept 3316; NDRC Applied Math Panel Rept 36). n.d. 7 p. Price: Microfilm - 50¢ - Photostat - $1.00
In this report, the author, an engineer with the Antiaircraft Artillery Board at Camp Davis, describes the procedures to be followed when the Stibitz method of using the tracer stereograph system is used for a vertical base line. The

tracer stereograph system is a method of error measurement used for the determination of the miss distances of tracers fired at aerial targets. This system employs recording theodolites which track the target continuously, photographing the target and the tracer position relative to the target at closely spaced intervals of time. After developing the film, it is possible to determine, from records taken simultaneously from two vertically separated stations, the instant of time at which each tracer reached the range of the target and then to read from the film at this instant the angular deviation of the projectile from the target. This system was first suggested by Dr. George Stibitz and was first used with a horizontal base line. Details of the method are given and are illustrated by drawings.

LEATHER AND LEATHER PRODUCTS

PB 28391. PAIAN, C. F. Some aspects of the German leather industry. (BIOS Final Rept 150, Item 22). Sep - Oct 1945. 150 p. Price: Microfilm-$3.00 - Photostat-$9.00
This report describes visits to several of the larger German sole and upper leather tanneries in the American, French and British zones. Except where it was in the interests of the national economy, little was done during the war to improve or develop the existing leather processes. The development of leather substitutes, tanning materials, and equipment is described. Information obtained in interview with Dr. Ing. Karl Pelmann of the Leather Products Development Division of I. G. Farbenindustrie A.G., Ludwigshafen, is presented under the following headings: Leather finishes of synthetic resin, casein-pigment and nitro cellulose; iron tannage, Ferrigan P.; synthetic tanning materials. Tanigans; aluminum tannage, Blancorol; oil tannage, Immergan, etc. A list is given of available pamphlets, some in English, concerning the properties and methods of use of various tanning and waterproofing agents. Descriptions of factories and processes of the following firms are also included: Joh. Knecht & Söhne, Elmshorn, Holstein; Lederwerke Wiemann A.G., Neumünster, Holstein; Norddeutsche Lederwerke A.G., Neumünster, Holstein; Herman O. Schmid, Neumünster, Holstein; Wickrather Lederfabrik A.G., Wickrath; Heyl'sche Lederwerke Liebenau, Worms; Cornelius Heyl A.G., Worms; Doerr & Reinhart, Worms; Carl Freudenberg B.m.b.H., including the Sigmunde Hirsch Tannery and The Naturin-Werk Fabrik, Weinheim; and Leather Tanneries at Backnang consisting of Fritz Häuser A.G., Carl Kaess G.m.b.H. and A. Hödum. In spite of damage present capacity of the tanneries is sufficient to take care of available supplies of raw hide.

LUMBER AND WOOD PRODUCTS

PB 23172. GARVER, R. D. Forest resources, wartime activities of the Forest Service. Jul 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
This is an address given at the Army Industrial College June 22, 1945 by the author who was director of the nation-wide Forest Survey of the U. S. Forest Service. He discussed the importance of the forest resources in the United States; the acreage covered; location of forests; uses; economic development and yields; serious over-cutting; industrial, private and federal ownership; cutover forest sections in the Great Lakes area, the Appalachian area and in the south; the depletion of forests through cutting more timber than is grown; the program of the Forest Service to combat depletions of forests; the great increase in use of wood by the armed forces; the stimulation of research in wood utilization; substitute materials; new forestry products; federal control of forests; stockpiles; statistics on forests and forest products; and related topics

PB 22132. SUPREME COMMANDER FOR THE ALLIED POWERS. NATURAL RESOURCES SECTION. Production, consumption and stockpiles of bamboo (a preliminary compilation). (Rept 27) Apr 1946. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This report discusses the importance of the bamboo industry in Japan. Consumption exceeded production in 1944 but the supply was replenished by the 1945 production which exceeded consumption. Figures by prefectures are given for: Production of Mosochiku shoots (for food) 1941 - 1943; production and consumption of bamboo 1944 and 1945; stock volume and price of bamboo Dec 1945; and classification of bamboo ownership by area. Tables also give selling dimensions and sales prices and subsidies to encourage production 1926-1941 of bamboo. A diagram showing official system of bamboo distribution, photographs, a map and charts are also included.

MACHINERY (EXCEPT ELECTRICAL)

German

PB 18514. BERGGEWERKSCHAFTLICHE VERSUCHSSTRECKE, DORTMUND-DERNE. Über die prüfung der zündmaschine ES. ms. lc. sch. der Firma Siemens & Halske, Aktiengesellschaft, Berlin-Siemensstadt, and supplement 1, dated Aug 31, 1934. (Tests of a blasting machine ES.ms.lc.sch. from the firm Siemens & Halske A. G. Berlin-Siemenstadt). (MIS VII 67b 7002400) Aug 1934. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers tests of a dynamoelectric detonator box or blasting machine which is hand operated by a rotating handle and takes twenty charges of bridge caps A. in series. The detonator box is designed for operating in fire damp pits. A detailed description is given of the detonator box and tests were made as follows: (1) The mechanical condition; (2) the electrical quality; (3) the electrical efficiency; and (4) the fire damp safety. These tests are described in detail. Supplement I certifies that this detonator is satisfactory and that previous recommended changes had been complied with. Attached is a leaflet from Siemens & Halske A. G. describing the machine with three illustrations. (In German.)

PB 18515. BERGGEWERKSCHAFTLICHE VERSUCHSSTRECKE, DORTMUND-DERNE. Über die prüfung der zündmaschine typ A.B. F.V.S. 50 der Firma Schaffler & Co., Wien. (Tests of a blasting machine type A.B.F.V.S. 50 from the firm Schaffler & Co., Wien). (MIS VII 67b 7002460) Jul 1934. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
A report is made on tests of a dynamoelectric detonator box or blasting machine which is hand operated by a rotating handle, and takes fifty charges of bridge caps A in series. The detonator box is designed for operating in fire-damp pits. A detailed description is given of the detonator box and equipment and the tests covered: (1) The mechanical condition; (2) the electrical quality; (3) the electrical efficiency; and (4) the fire-damp safety. These tests are also described in detail. (In German).

PB 25009. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. Hypergol - mixing nozzle for 200-300 kg thrust (drawing). (Halstead exploiting Centre Rept 543) n. d. 1 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 22184. BROADBENT, F. German chemical plant with particular reference to centrifuges. (BIOS Final Rept 247, Item 22) Feb 1946. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
The plants visited and a few of their particulars are: (1) Klmore Metall A. G., located at Schladern on Sieg, where there is manufactured electrolytically deposited copper shells, the works being divided into two sections, one being a tube drawing section, and the other making electrolytically deposited copper cylinders (which may be used in centrifuges). (2) H. Krantz Maschinenfabrik, Aachen, specializing in hydro extractors suitable for laundries and textile works; (3) O. Dörries A.G., formerly Banning and

Seybold, Düren, producing "erkensators" a centrifugal machine for the removal of impurities from paper stock; (4) I. G. Farbenindustrie, Dormagen, using Escher Wyss centrifuges in the cellulose acetate plant; (5) I. G. plant, Elberfeld, using Wyss centrifuges in the hexamethylenetetramine plant; (6) Glanstoff Courtald, between Cologne and Dormagen, in which water was extracted from the viscose cakes in the cake washing plant, using (a) multiple hinged candle hydro extractors and (b) converted spinning pots; (7) Matthes and Weber, Duisberg, using Escher Wyss centrifuges in the bicarbonate plant; (8) Westfalia Separator A.G., Oelde, specializing in high speed centrifuges of the Laval type; and (9) Escher Wyss Ravensburg, manufacturing both centrifuges and spray driers.

PB 25647. COBBING, J.H.W. German chemical plant manufacture. (BIOS Final Rept 341, Items 31,22) n. d. 11 p. Price: Microfilm-$1.00 - Photostat-$1.00
The engineering works of Werner and Pfleiderer at Stuttgart was visited in order to investigate the developments in mixing and grinding machines for chemical processes during the war. This plant was bombed four times but was yet able to approach a production rate of 75% of pre-war production. Photographs of single and double bladed and rubber mixers, of a disc shredder for the rayon industry, and of a centrifuge for screening viscose are shown. Very brief descriptions of these machines are given.

PB 22190. COWDEROY, J. A. Reports on visits to engine works. (CIOS File XXVI-4, Items 28, 29) 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The first report covers a visit made to the Aero engine test plant at Rothenbach, Germany to investigate the reported extensive Aero engine test plant operated by Daimler-Benz here. Very brief information is given on equipment found. The second report covers a visit to M.W.M. factory at Mannheim to obtain information on the M.A.N. diesel engines for the type XXI U boats, which the firm had been reported building under license, and to obtain details of other engines manufactured by this firm. A list of engine models built is presented giving cylinders, horse power, R.P.M. weight, bore and stroke. Brief description of these engines is also included. The third report covers a visit to Brown, Boveri Co. at Mannheim, to obtain information regarding: Exhaust gas driven superchargers said to be for the "M.A.N." diesel engine for the type XXI U boat; and manufacture and development of gas turbines and axial air compressors. These are briefly described herein. Some data on turbo blowers and turbo compressors, obtained in an interview with Herr Koskritz, project engineer for the company, are also given.

PB 23096. ERIKSON, R. E. German construction equipment. (U. S. Naval Tech Mission in Europe; Tech Rept 515-45) Oct 1945. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is based on an extensive coverage of Germany during which manufacturers of equipment were interrogated and contractors questioned on methods of construction and machinery used. This report discusses some of the machines and equipment used in Germany during the last ten years. Though construction in both scope and engineering compared favorably with United States, the Germans did not have the advantage of highly developed construction equipment. Discussed in this report are excavators, side dump cars, scrapers, rock crushers, road rollers, pneumatic equipment, and concrete mixers. No tractors or bulldozers were found on construction sites. The writer's impression of construction equipment in Germany was that for the most part equipment was clumsy, heavy and awkward. Only in cranes and concrete mixers did the equipment seem comparable to that used in the United States. The report includes photographs of equipment found.

PB 23189. FRANZEN, TORE. Laboratory for the study of tracked vehicles located at M.A.N. factory in Nuremberg. (CIOS File XXXII-32, Items 18, 19) Aug 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This laboratory, as well as all of its equipment, was owned and operated by German High Command (Ober-Kommando des Heeres). It was designed and operated by E. Lehr and Mr. Kriebel of the M.A.N. (Maschinenwerk Augsburg-Nürnberg) Organization. The laboratory building is completely destroyed but most of the equipment is in reasonably good order, except for the effects of the elements and for the loss of some small measuring instruments and control mechanism destroyed by bombing. The following machines are described in this report: Torsion fatigue testing machines; push/pull fatigue testing machine; oscillating platform for the determining of center of oscillation of vehicles; roller stand for test of vehicles; suspension wheel test machine; revolving beam testing machine; and needle bearing test machine. Diagrams and photographs illustrate the report. The appendix contains a list of books and papers written by Dr. Ernest Lehr on the subject of testing technique. The two torsion fatigue testing machines were recommended for removal to the United States to be used by the Army and/or industry for the further development of torsion bars for suspension of vehicles and for other purposes.

PB 18194. HELMAR. Künstliches klima. Klimaanlagen und ihre anwendungsgebiete in der industrie. (Artificial climate [Air conditioning]. Its installation and utilization in industry). (MIS VII 67b 7001940) n. d. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
A report, apparently dated 1942, showing the start and slow development of that industry in Germany. The textile and tobacco industries have first recognized the value of air conditioned plants. Report predicts large future utilization in Germany, especially in the food industry and in the newspaper printing industry. (In German).

PB 22799. HERBERGER, CHARLES and KELLER, ALLEN. Manufacturing process for fabrication of master dies for compressor blades. (Naval Tech Mission in Europe Tech Rept 155-45) Sep 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this report is to outline briefly the manufacturing technique used by WMF (Württembergische Metallwarenfabrik-Geislingen, Steige) in the fabrication of master-master dies for making compressor blades for jet propulsion engines. Papers written under the direction of Dr. Arthur Burkhart, technical director, describing this novel way of making master-master dies and on corroding (etching) to produce dies are discussed. The finishing of a master-master die using the Zeiss-Optical dividing head is also described. Tool manufacturing according to the WMF corrosive process is discussed at length. Photograph and drawings are included. Some of the drawings may not reproduce well.

PB 23082. HOPKINS, CHARLES A. Demag pneumatic pile driver. (U. S. Naval Tech Mission in Europe Tech Rept 508-45) Sep 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is a translation of a German booklet covering a pneumatic pile driver manufactured by Demag, Duisburg, Germany. It contains one outline drawing and two sectional drawings with the various parts numbered, and identified in the text of the translation. The booklet describes the method of operation, gives operating and rigging instruction and also contains a parts list.

PB 9099. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Elastische kupplung (Elastic coupling). German patent application T61233 XII/47c applied for Dec 7 1944 and still pending. Original inventor: Kalweit. 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9063. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Gerätaufhängung (An equipment suspension). German patent application T57146 II/63c still pending. Original inventor: Paschke. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9011. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Kugellager (Ball bearings). German patent application Z57003 XII47b applied for Mar 5 1942 and still pending. Original inventor: Willers. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This invention pertains to the construction of ball bearings with multiple action by using one ring as the race for one set of balls and as the cup for the other set. This results in dividing the relative number of revolutions and increasing the load. A drawing is included.

PB 8963. TELEFUNKEN GESELLSCHAFT FUR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schnellwirkendes schneckengetriebe. (A fast acting worm drive). German patent application Z56671 XII/47h Dec 20, 1941 still pedning. Original inventor: Paasch. 1941. Illustrated.

PB 25136. U. S. ENGINEER BOARD. German portable mortising tool: Evaluation report. (Rep 3438) Apr 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
The German portable mortising tool consists of a 1-cylinder, 2-cycle gasoline engine with a dog-type clutch to free the engine from the small chain mortising cutter. The tool, used for mortising in timber construction, is mounted on two steel posts and slides up and down when cutting. Photographs of the tool are included.

PB 23362. U. S. STRATEGIC BOMBING SURVEY. The German anti-friction bearings industry. (Rept 53) Nov 1945. 259 p. Price: Microfilm-$3.00 - Photostat-$18.00
The bearings industry was selected as a target for 40 air raids in 1943-44 because of the importance of bearings as essential components of mechanical devices used in warfare, from planes to tanks, and because of its concentration in large plants as those at Schweinfurt, Stuttgart, Steyr and Berlin. This report presents a comprehensive survey of the pre- and post-raid industry and gives results of the bombing attacks in: (1) Damage to plants, machines and stocks; (2) failure of plants to meet planned output; (3) cost of and loss of efficiency in dispersal of plants; (4) man-hours lost during raids; (5) absenteeism as results of raids; (6) delay and cost of redesign of equipment to eliminate or reduce the number of bearings needed. Building damage equalled half the pre-raid floor space, machine tools showed less damage. Though stocks were damaged and production cut, it was not possible to put whole plants out of operation, or to destroy the industry, due to the prompt and energetic measures adopted by the Germans in prompt repair of damages, dispersal, and restoration of untouched facilities; and through the Sonderring Walslager, which rigidly controlled the production and distribution of the bearings produced. Photographs, tables, graphs, charts, plans, and maps are included.

PB 23364. U. S. STRATEGIC BOMBING SURVEY. The German machine tool industry. (Rept 55) Nov 1945. 108 p. Price: Microfilm-$1.50 - Photostat-$8.00
This survey of the German machine tool industry to determine if it should have been picked as a target for concentrated bombing raids in 1943-44 arrives at the conclusion that bombing of these plants would not seriously have affected the supply for war needs, and therefore no serious hold-up would have occurred if this industry had been picked for heavy bombing raids. The study provides a comprehensive review of the industry, an analysis of its operation, location and production, and list the major firms. The report of the 19 man team which surveyed the 27 German plants makes the following points: (1) German machine tools are largely general purpose machines which could be adapted to a variety of uses; (2) discontinuation of export of these machines provided a sufficient back-log for war needs; (3) this industry was not allowed to keep its highly skilled labor, and allocations of metal were difficult to obtain, indicating that this was never a critical industry; (4) the extreme decentralization of the industry made heavy bombing unprofitable; (5) a 500-pound bomb must make a direct hit to destroy a machine. The report includes copies of the questionnaire sent to all 27 plants, a list of men innterrogated, a list of the plants surveyed, with personnel and production data, and the economic value of their products. Graphs, charts, tables and maps are included.

PB 23363. U. S. STRATEGIC BOMBING SURVEY. Machine tools and machinery as capital equipment, a study of the German war-time capacity and production. (Rept 54) Nov 1945. 96 p. Price: Microfilm-$1.00 - Photostat-$7.00
This report deals with the amount of damage to machine tool in the aggregate; with the German machine tool situation in general, and the vulnerability of the equipment industry to bombing. A history of the German equipment industry is followed by a comparison of the utilization of capacity of production in Germany and in America during the war in terms of labor productivity, annual production of goods, allocation of materials unfilled demand, shortages and repair for replacement. Lack of adequate economic intelligence had caused Allied belief in a machine tool shortage that this study does not bear out. Workers worked on a single shift only because there was no great need for increased production, in fact several plants converted to munitions and armament without this knowledge being available through intelligence reports. Based on figures for damages to the bearing and aircraft engine plants, bombing damage to machine tools may have been no greater than 2-2½% of machines out of commission at any one time. Lessons drawn in the comparative importance of industrial targets for heavily concentrated bombing are: (1) Indiscriminate bombing of industrial targets generally, or of the machine tool industry itself, would have been ineffective; (2) in selection of targets, an important factor is the selection of plants that cannot be easily dispersed, as the steel industry, synthetic oil industry, oil refining, the chemical industry etc; (3) an industry in which the the equipment cannot be easily replaced or converted from other available equipment is also an acceptable target. A 26-table states-trial appendix presents information on employment and production in the machine tool and machine-tool-using industries.

Japanese

PB 23624. RUST, CLAYTON A. Japanese crawler-mounted air compressor. Evaluation report. (Engineer Bd Registration 468) Apr 1946. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00
Subject is a crawler-mounted air compressor unit, employing an air-cooled V-8 gasoline engine for motive power. It has four speeds forward and one in reverse. A power take-off connects the compressor to the engine. The compressor is a two-stage, six-cylinder, air-cooled type. The cylinders are arranged in three banks of two cylinders each, 60 degrees apart, with the center bank being the second stage. The compressor appears to be a very close copy of the Ingersoll-Rand type 40, as far as construction and performance are concerned. It has no apparent advantages over the Ingersoll-Rand type 40 since the two are almost identical in size, performance, and design. The primary differences between the Japanese and U. S. compressor are that the Ingersoll-Rand type 40 has a direct rigid drive, individual inlet and discharge valves in the first-stage heads, and a two-throw crankshaft, with connecting rods from two first-stage pistons and one second-stage piston using the same crankpin. On the other hand, the Japanese compressor has a right-angle drive with universal joints on the shaft, combined inlet and discharge valves on the first stage, and a six-throw crankshaft with each piston rod on a separate crankpin. Photographs are included.

United States

PB 20268. JONES AND LAMSON MACHINE CO. and BRYANT CHUCKING GRINDER CO., SPRINGFIELD, VT. Screw threads, a bibliography of available material on screw thread theory, standards, production methods and gaging methods. Summary report. (OSRD Rept 1101) Jul 1942. 489 p. Price: Microfilm-$5.00 - Photostat-$33.00
This report presents the bibliography of screw thread theory, practice and instruments as derived from periodicals, books and technical papers published in the U. S. and other countries. The material is classified, with titles arranged in inverse chronological order.

PB 23170. U. S. ARMY INDUSTRIAL COLLEGE. DEPARTMENT OF RESEARCH. War production problems of the anti-friction bearing industry. Oct 1945. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is a report of a meeting held on September 20, 1945, at the Department of Research, the Army Industrial College, as part of a seminar to consider war production problems of the anti-friction bearing industry. The meeting was attended by representatives of industry, the War Production Board and the Army Industrial College. The following questions were discussed: Should the placing of war contracts with this industry be handled by the armed services or a civilian organization like the War Production Board? To what extent has rivalry or competition between services increased difficulties of management? What efforts have been made toward standardization of design and production? What steps should be taken in the future? Should pool orders be placed for antifriction bearings? Were unnecessary difficulties caused by changes and uncertainty in Army and Navy needs? What system of material control is best? Should a program of stockpiling be adopted now? What system of scheduling orders is best? What can be done to get honest "required" dates? What revisions in manpower and Selective Service policies are recommended? Should consideration be given to concentrating in certain plants the production of particular types and sizes of bearings for which they are best qualified? What is the best way to finance plant expansion?

PB 22688. U. S. WAR DEPARTMENT. Air conditioning unit, self-contained type, water-cooled with cooling tower, 5-HP motor, 60,000 BTU per hour (approximately), Chrysler Airtemp model 580A-M: Operation, maintenance and repair instructions. (Tech Manual 5-9484) Mar 1946. 82 p. Price: Microfilm-$1.00 - Photostat-$6.00
This manual contains instructions on the operation, maintenance and repair of the Chrysler Airtemp self-contained type air conditioning unit, model 580A-M. By means of a refrigerant system, a water system and two separate air-handling systems, the unit dehumidifies, filters, controls the temperature of, and circulates the air. A list of auxiliary equipment is given and appendix contains instructions on shipment and storage, and list of supply catalogs and other publications. Diagrams and photographs illustrate the text.

PB 22075. U. S. WAR DEPARTMENT. Cable testing unit, Defiance Alloyed Products models 130: Portable dry air compressor. (Tech Manual 11-2539) Jul 2, 1945. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
The cable testing units described in this manual are compact, lightweight, electrically driven, semidiaphragm type, air-compressing units. The major assemblies, consisting of the driving motor (a.c. or d.c.), compressor unit, drying jars, hose, and attaching cable are mounted on a plywood support. This device is used for flash testing of lead covered telephone cable splices, for location of openings in the cable sheath and for removal of moisture from the cable. Instructions are given for installation, assembly, operation, maintenance, disassembly and repair. The appendix contains a list of references, parts lists, list of abbreviations. Photographs and drawings illustrate the text.

MEDICAL RESEARCH AND PRACTICE, INCLUDING CLINICAL APPLICATION OF DRUGS AND PHARMACEUTICALS

German

PB 23079. PRENTICE, T. M. German Naval hospitals. (U. S. Naval Tech Mission in Europe Tech Rept 527-45) Oct 1945. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this investigation was to secure information of interest to the Bureau of Yards and Docks in regard to the structural and planning features of German Naval hospitals and to compare German practice with that in the United States. This report contains a brief description of three German hospitals located at Neuemkirchen, Bremen, and Bremerhaven. Only a brief report is given on the hospitals at Neuemkirchen and Bremen which were found to be of no technical interest. The Marinelazarette at Bremerhaven built in 1938 was found to have a fine modern building which compared favourably in many respects with modern U. S. Naval hospitals. It is described in some detail. Plans of Neuemkirchen and Bremerhaven hospital are included. These may not reproduce well.

PB 23565. U. S. STRATEGIC BOMBING SURVEY. The effect of bombing on health and medical care in Germany. (Rept 65) Oct 1945. 428 p. Price: Microfilm-$4.50 - Photostat-$29.00
This is a report of the manner in which Allied air attacks on German cities and industries influenced the health of that country. It is neither a sanitary report nor a compilation of vital statistics but rather a study of every facet of German health, an analysis of the health aspects of the surroundings in which the German people lived, what they ate, how they ate, how they were cared for medically, and how they were injured and died in the raids. In other words this is a description of the manner in which a thoroughly regimented nation reacted to air raids. The subject headings are: Civilian deaths from air attacks; the nature of air raid casualties; communicable diseases and other disorders; industrial health; vital statistics; medical personnel; medical education; hospitalization; environmental sanitation; food supply and nutrition; and medical supplies - development, production and distribution. Tables, graphs, diagrams, and photographs are included; appendices are attached.

Japanese

PB 22126. U. S. ARMY FORCES IN THE PACIFIC. MEDICAL ANALYSIS SECTION. Set, surgical instrument, substitute. (Rept 178) Feb 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The Japanese surgical instrument set described and illustrated was manufactured sometime in 1945, and replaces the surgical instrument set, type 1938. It consists of one chest whereas the earlier set consisted of two chests, both of which were slightly larger than the new model. An inventory of the contents is given.

United States

PB 22991. BEALS, L. S. and LUYKX, H. M. C. Report on night flying disorientation. (Bur of Medicine and Surgery Res Project X-259) n. d. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
A study undertaken at the U. S. Naval Air Station, Anacostia, D. C., to determine the degree of disorientation or autokinetic illusory effect of a point source of light against a dark background is described. Methods of testing are given, and results evaluated. An outline of further necessary studies, prior to continuation of actual simulated flight studies, is presented.

PB 25363. BOULER, N. M. The carbon dioxide elimination and volume of air breathed by the goat. (Edgewood Arsenal Chemical Div Rept 441, supp 1) Jul 1928. 9 p.
Price: Microfilm-$1.00 - Photostat-$1.00
The literature describes a series of metabolism experiments which were conducted with a goat under various conditions of experiment, none of which could be regarded as basal. The data contained in these articles have been studied and formulas have been derived for the calculation of carbon dioxide elimination and volume of air breathed by the goat under the various conditions of experiment. Similar conditions for basal conditions have been estimated. Comparisons are made with the basal metabolism for man.

PB 25362. BOULER, N. M. Fundamental study of toxicity. The carbon dioxide elimination and volume of air breathed by warm blooded animals, with mathematical formulas. (Edgewood Arsenal Chemical Div Rept 441) Jan 1928. 115 p.
Price: Microfilm-$3.00 - Photostat-$8.00
This investigation was made in the hope that it would be of value in the proper interpretation of numerous data obtained during the war relative to the effect of the respiration of toxic gases on man and animals. The literature was searched for data on carbon dioxide elimination and volume of air breathed by man and warm blooded animals, under the "basal" condition or under the condition of minimum functional activity. Some additional experiments were also made. The data obtained were thoroughly studied, and formulas were derived in terms of grams of CO_2 per hour eliminated, and volume of air inspired (20°C., 760 mm. pressure, and 50% relative humidity) in liters/minute. The average volume percentage of CO_2 in expired air (dry, and reduced to 0°C. and 760 mm.) is 3.83, and this is regarded as constant for all species of warm-blooded animals. Basal metabolism formula are given in terms of carbon dioxide elimination. Tables, graphs, bibliography. See also PB 25363.

PB 22995. COREY, E. L. and WEBSTER, A. P. Design of safety diving equipment. (Bur of Medicine and Surgery Res Project X-107) Aug 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report summarizes the work that was done on testing an automatic pressure-regulating valve as a means of governing the pressure within a diving dress in such manner as to prevent divers' "squeeze" attributable to accidental underwater falls. The following conclusions were reached: (1) A pressure-regulating, anti-squeeze valve, by-passing the diver's manual air valve can be made to automatically deliver a sufficient amount of air so that squeeze does not take place from underwater falls up to 40 feet; (2) a small, compact valve operated by a pressure-disc instead of a simple diaphragm would be better than the large and bulky valve used in the tests; and (3) use of sea water pressure for operation of an anti-squeeze valve is probably the most practical means of actuating the mechanism. Two enclosures are attached to the report: (1) An analysis of divers' "squeeze"; and (2) suggested means by which divers' "squeeze" may be prevented.

PB 22992. COREY, E. L. and WEBSTER, A. P. Field study of the effects of benzedrine on small arms firing under conditions of acute fatigue. (Bur of Medicine and Surgery Res Project X-130) Jun 1943. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
One hundred men were kept continuously active for 60 consecutive hours, half the group receiving benzedrine sulfate medication and half receiving a placebo. This report contains a detailed description of this study of the effects of benzedrine on accuracy of small arms firing under conditions of fatigue. It was found that benzedrine had no deleterious effects and that the administration of benzedrine resulted in superior firing performance. Tables and charts present test data. This report comes from the U. S. Naval Research Institute, National Naval Medical Center, Bethesda, Maryland.

PB 20685. HENLEY, F. M. and KUHN, H. A. DM its penetration of smoke filter and its effect on man. (Edgewood Arsenal Chemical Div Rept 80) Dec 1921. 15 p.
Price: Microfilm-50¢ - Photostat-$1.00
Observations are made regarding the penetration of the gas mask canister by DM (diphenylaminechlorarsine) particles. The report also describes the effect of DM upon exposed persons.

PB 22963. U. S. BUREAU OF MEDICINE AND SURGERY. Pre-oxygenation in the prevention of bends; rest vs. exercise. (Res Project X-114) n. d. 11 p.
Price: Microfilm-50¢ - Photostat-$1.00
Data presented form the basis for answers to a number of questions concerning protection against aero-embolism, or bends, during high altitude flights. Procedures and findings of tests are described. The report concludes, among other things, that, in a group of men whose mean age is 33, decompression time may be substantially reduced by exercise, during pre-flight oxygenation; and that tolerance to high altitude, with regard to bends occurrence, is characterized by considerable daily variation, regardless of whether protection is furnished by rest or exercise pre-oxygenation.

PB 23049. VERPLANCK, W. S. The effects of paredrine on night vision test performance. (Bur of Medicine and Surgery Project X-226) May 1944. 14 p.
Price: Microfilm-50¢ - Photostat-$1.00
Experimental procedures and findings are described. The results of adaptometer tests indicate that the use of the mydriatic drug, paredrine, is associated with improved performance on tests of night vision. This improvement is statistically significant. Tables and graphs are included. This is a report from the Medical Research Dept., U. S. Submarine Base, New London, Conn.

METALS AND METAL PRODUCTS

German

PB 24987. BOLLENRATH, FRANZ. Publications of Franz Bollenrath. Appendix. (BIOS Halstead Exploiting Centre Rept 612). n.d. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This is an English translation of a list of 102 publications of Franz Bollenrath which were published from 1928 to 1944 in various German publications including "Aeronautical Research", Metal-trade, Archives-Metallurgy of Iron, Metallography Review, and the publications of the Association of German Engineers, of the Lilienthal Society for Aeronautical Research and of the German Research Institute for Aeronautics. The titles of many of these reports indicate that they deal with the properties of light metal alloys, welding, materials for aircraft construction, the properties of steels, X-ray measurements of tension, the manufacturing of compound bearings, and investigation of heat treatment of metals.

PB 24959. DIRKSEN. Report - as requested by telegram - on the results up till now of the tests with test-pieces of iron and aluminum oxide. (BIOS Halstead Exploiting Centre Rept 10042). Feb 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This report gives results of endurance tests at 900° on two test-pieces - one 60% iron, 40% aluminum oxide, and the other 20% iron, 80% aluminum oxide.

PB 20666. FOSTER, E. M. Magnetic materials and beryllium. (BIOS Final Rept 36, Item 21). Aug 1945. 28 p. Price: Microfilm-50¢ - Photostat-$2.00

The Heraeus Vacuumschmelze A.G. at Hanau was visited to obtain samples of materials manufactured by them with particular reference to magnetic alloys, glass sealing materials and blue prints of the vacuum furnaces for the production of the alloys. The casting temperatures of different alloys are listed. The effect of aging on the magnetic properties of strained "mumetal" at 200°C. and 300°C. was discussed, as was the casting of "Kovar". Information was obtained at this plant also on beryllium, and for the same purpose the Deutsche Gold- und Silber-Scheideanstalt (Degussa) was visited. The production methods for producing beryllium copper are described and include the melting, casting, forging, cleaning, and pickling. Details are also given of the extraction of beryllium from the ore. The toxicity of beryllium is mentioned briefly. The appendixes list the samples and pamphlets taken from the H.V.A.G. (Heraeus Vacuumschmelze, A. G.) and include a process chart for the production of beryllium metal and beryllium oxide.

PB 18195. GERMANY. HEERESWAFFENAMT. Grauguss Richtlinie B f F Nr. 1. (Cast iron. Information sheet No. 1) (MIS VII 70a 7000421) Sept 1943. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This information sheet issued by the Commissioner of the German Army Ordnance, manufacturing division (B f F) contains specialized methods for the use of cast iron for armament production, especially as a substitute for "Sparstoff" (metals to be saved).

PB 23626. GILL, JAMES P. Vereinigte Deutsche Metallwerke, Heddernheim, Germany. (FIAT Final Rept 760) Apr 1946. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00
The factories comprising the Vereinigte Deutsche Metallwerke, the products manufactured, and their composition are given in this report. The most interesting operation was a so called "extrusion" of a composite alloy. The outer portion of which was iron and the inner part bronze. A description is given of this operation, but the investigator was dubious of the process and felt that a further investigation by a non-ferrous metallurgist would be justified.

PB 20663. HAENNI, P. M. and PEARE, T. J. Note on German technique in the production of light alloys. (BIOS Final Rept 279, Item 31). Feb 1946. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
German scientific and technical development of light alloys followed similar lines to those which took place in the Allied countries. In one respect, however, the development of substitute aluminum alloys to economize in certain key metals such as copper, nickel, etc., there has been no exact parallel line of development. Casting alloys, made from virgin aluminum, were copper-free or contained less than 1% of copper. A copper-free alloy for die-casting aeroengine cylinder heads was developed. Shortages of silicon also forced a reduction of silicon alloys. The Germans had also greatly developed: (1) The extensive use of semicontinuous methods of casting, rolling, and extrusion stock; (2) induction melting combined with the use of electric resistance holding furnaces; (3) the production of sheet of tapered section; and (4) electric refining for scrap recovery. The report describes various methods for the reduction and refining of aluminum, the melting and casting of aluminum alloys, casting of magnesium-aluminum alloys, and the casting of aluminum parts of engines including pistons. Sheet, tube, rod and bearing metals are treated. Tables.

PB 23748. HALL, HERBERT H. and KEMP, JAMES T. Aluminum and magnesium fabrication at Leipziger Leichtmetall Werk-Rackwitz, Rackwitz-Leipzig-Saxony-Germany. (CIOS File XXX-72, Item 21) Sep 1945. 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
The factory described in this report is a large producer of both aluminum and magnesium extrusions and sheet. The methods and equipment are similar in general to those used in plants fabricating these products. There are, however, several unusual practices that deserve special attention, as follwes: (1) Brown Boveri combination induction melting and holding furnace; (2) extra long D.C. ingots cladded in molds; (3) Junghans continuous casting machine; (4) aircraft scrap recovery furnace; and (5) proposed carbo-thermic process to extract aluminum from clay. Processes of aluminum scrap recovery and of the reduction of aluminum from clay are described in some detail. Photographs, diagrams, and a plan of the plant appear in the appendix. These may not reproduce well.

PB 23749. HALL, HERBERT H. Aluminum fabrication at the Osnabrücker Kupfer and Drahtwerk, Osnabrück, Germany. (CIOS File XXX-73, Item 21) Sep 1945. 22 p. Price: Microfilm - 50¢ - Photostat - $2.00
This works has for years fabricated copper, brass, and steel but due to shortage of copper turned to the use of aluminum. The war demands encouraged an increase in the use of aluminum and also forced the use of zinc. At first aluminum was fabricated in the brass mill equipment. Later, the volume of aluminum resulted in the construction of an entirely new aluminum plant. As in other similar cases, the equipment put in was based on the better known and established practices of older aluminum plants. Consequently there is no equipment, process or metallurgical development at the O.K.D. Aluminum Fabricating Shops that is novel or of any particular significance. The alloys used were the standard dural alloy with 4% copper which was later cut to 3%. Report describes the following separate units of aluminum fabricating plant: Aluminum casting shop, extrusion mill, rolling mill, and wire and cable mill. The appendix contains lists of equipment and machines and a plan of the works which may not reproduce well.

PB 23017. HALL, HERBERT H. and KEMP, JAMES T. Mansfeldscher kupferschieferbergbau A.G., Hiseleben, Germany. (CIOS File XXXI-65, Item 21) Aug 1945. 9 p. Price: Microfilm - 50¢ - Photostat - $1.00
This is a report of a visit to the above cautioned mining operation, which was considered an important source of copper and other non-ferrous metals, acid and paving blocks in western-central Germany. The smelting and recovery operations are not new although the nature of the ores makes the treatment novel. Costs are so high that operations have only been possible with the aid of government subsidy. One cause of unsatisfactory operation is the scattered, old, badly coordinated plant. Subsidy in 1944 was stated to have been equivalent to one third the production cost or half the selling price of copper. The company is at the end of its financial resources. The operations warrant critical examination for their historical mining and metallurgical interest and because the ores are unique. Mining operations have been carried on in the "Mansfelde Molde" for 750 years. Practice appears to have evolved on the spot with little regard for mining and smelting developments elsewhere in the world. Some importance attaches to the fact that the company supplied a substantial part of Germany's requirements for copper and lead contributed other non-ferrous metals, acid, paving blocks and locally, electric power, to the national economy.

PB 20897. JACOBS, T. D. Ruhrstahl (Henrichshütte Works), Hattigen. (BIOS Evaluation Rept 367) Feb 1946. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
About 20,000 tons of steel per month was produced at the Henrichshütte Werks, a component plant of the Ruhrstahl group. The forging of gun components was done with old-fashioned equipment. The outstanding feature of the machinery was the solid boring with a type head invented by Herr Beisner and suitable for bores varying from 20 mm to 85-90 mm.

PB 23018. KEMP, JAMES T. Georg von Giesche's Erben, Magdeburg. (CIOS File XXXI-56, Item 21) Aug 1945. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00

Subject company is a zinc mining and smelting company whose mines and ore dressing works are located in Upper Silesia. The concentrates are shipped to Magdeburg for reduction. The normal output of the concentrator is 6,000 to 7,000 metric tons per month, averaging 60-62 percent zinc, 3 percent iron, 1 percent lead and 0.25 percent cadmium. At the Magdeburg works the sulphide concentrates are roasted, leached with sulphuric acid and the metal recovered electrolytically, cathodes and high grade purchased scraps are melted in Siemensinduction furnaces from which 20 kg slabs are cast by hand ladling. The salable products are, in the order of recovery: Sulphuric acid, electrolytic zinc, electrolytic cadmium and lead bearing residues. The outline of refinery practice mentioned in the report as an appendix is not included. Nothing new or of value in refining or alloying zinc for industrial consumption appears to have been developed by this company, the leading German producer of electrolytic zinc, since the outbreak of the war.

PB 23019. KEMP, JAMES T. Schneider, Hugo, A.G., Messingwerke, Aluminum Werke, Taucha-Leipzig, Germany. (CIOS File XXXI-57, Item 21) Aug 1945. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00
The brass and aluminum mills of this installation are minor departments. The brass mill is small, not remarkable in equipment other than one unusual design of Siemens low frequency induction furnace and the universal use of water cooled molds. The aluminum plant is relatively small and also not remarkable except that the hot rolling stands appear to have been built for steel. The hot mills and their heating furnaces are tightly sandwiched in one comparatively small building. Clad steel, bullet jacket strip, was also rolled on two stands in this department. The shortage of copper was a factor in the brass mill schedule. At the time of stoppage of operations, the aluminum rolling mill was rolling Leipziger clad-dural sheets on tell. The composition percentages of the brass produced is given together with the average month's capacity of steel, including clad, copper base alloys, aluminum and aluminum alloys in sheets, strips, wire and rod.

PB 23188. KEMP, JAMES T. and others. Recovery of metals from scrapped airplanes, a review of German practice at the end of the war. (CIOS File XXXII-55, Item 21) Aug 1945. 29 p. Price: Microfilm - 50¢ - Photostat - $2.00
Light metals were systematically reclaimed from scrapped airplanes in Germany in the later years of the war. These operations were uniformly profitable although different procedures were followed in the several plants. Reclaimed aluminum and magnesium were, moreover, increasingly important sources of supply as access to good ores was choked off. Reclamation, and refining was usually done by fabricators as part of or closely integrated with regular casting shop operations. At least 70% of the reclaim was of high enough quality to be used directly in the manufacture of a new wrought alloy for all constructional purposes. The balance found an outlet in remelting ingot. Had Germany held out another twelve months, some of the larger fabricators would have replaced 85% to 100% of their virgin aluminum requirements for the durals and clad alloy with the secondary they were reclaiming. Two objectives would have been attained, (a) they would have made money, and (b) they would have absorbed a surplus of metal sure to be embarrassing to the industry. Everyone separated aluminum from mechanically associated heavy metals (except lead) by melting on sloping hearths. There were several designs of furnace, but the functions were the same. Melted aluminum drained off into twin forehearths. The metal in one forehearth was quickly analysed and graded while the other forehearth was filling. Unmelted steels, etc., were raked off the melting hearth and disposed of as mixed light steel scraps. This report describes the recovery operations from the breaking up steps at designated airfields to finished alloy castings ready for rolling or extruding. Diagrams and photographs illustrate the report.

PB 23183. LINK, ALBERT H. Vereinigte Leichtmetall Werke G.m.b.H., Hannover, Linden, Germany. (CIOS File XXXI-73, Item 21) May 1945. 26 p. Price: Microfilm - 50¢ - Photostat - $2.00
The business of this concern was principally the processing of aluminum, magnesium and alloys, into semi-finished forgings or extrusions, and the making of heavy sheets from aluminum, magnesium and from alloys such as dural, alclad, etc. No casting except casting of ingots for raw material source was done. This plant recovered aluminum from scrap, especially airplane scrap. Production of VLW in October 1944, the last full-scale month before the production drop due to bombing, was 3,161 tons of aluminum and alloy sheets and shapes. In this same month only 36 tons of magnesium were produced. VLW's production went entirely into war work, 85% to air forces, 10% to navy and 5% to army. This concern employed 2,500 workers in full production. Among the technical developments in production were a patented process for continuous casting of ingots called "Wassergüsse", the development of aluminum-magnesium-zinc alloys, a process for controlling corrosion in heating magnesium billets, and a new furnace and method for producing from scrap, material fully equal in characteristics to virgin aluminum. VLW also developed a new fast method for chemical analysis which gives results in 20 minutes. New methods for microtensile and spectrographic analysis were developed and research work on powder metallurgy and in aluminum magnesium alloys containing a high percentage of magnesium had been done. Included in this publication are reports on chemical testing methods, a summary of airplane propeller blade forging production in Germany and a summary of monthly production of VLW by principal items for the year 1944.

PB 25651. NORMAN, H. W. Waggonfabrik A.G. (Ringfeder (G.m.b.H.)) Uerdingen. (BIOS Final Rept 323, Item 21). Dec 1945. 6 p. Price: Microfilm-$1.00 - Photostat-$1.00
This is a report of a visit to the above German firm in Dec 1945. Members of this firm are inventors of ring-springs and the special rolling mills on which the springs are formed. As these works were undamaged, production of ring springs for commercial purposes was being carried on and an inspection of two shops was made. Demonstrations were given of rolling ring springs for use on railway buffers 165 mm. O.D. Details of cleaning, coating and testing are given, also a brief description of a demonstration of the manufacture of smaller rings. Drawings and data in tabulated form were obtained, but are not included in this report. The particulars obtained cover ring springs varying in size and capacity from 40.6 mm. O.D. for a load of 800 kgs, to 170 mm. O.D. for a load of 48,000 Kgs. Much larger ring springs have been made for special purposes and up to 750 tons capacity for use on heavy presses. The author states that the comprehensive range of ring springs manufactured by this firm is sufficient indication of the confidence which German industry placed in this form of springing and suggests that British manufacturers avail themselves of this experience.

PB 23198. RANDALL, JOHN F. Welding of German armored vehicles. (CIOS File XXXIX-44, Items 18, 21) Mar - May 1945. 59 p. Price: Microfilm - $1.00 - Photostat - $4.00
This report on the welding of German armored vehicles is based upon examination of facilities and interrogation of personnel at the German plants engaged in welding of armor structures for vehicles and at plants engaged in design, assembly or testing of armored vehicles or armor structures. The investigations revealed a number of points. Because of the joint type used or the relatively poor quality of the oxygen cutting, a considerable percentage of the plate edges of the German armor are machined. Three general types of joint designs are used on recently designed German armored vehicles: (1) Combination groove and fillet; (2) stepped joints, and (3) interlocked joints. The notched type interlocked joint appears to have certain favorable characteristics. Special ferritic electrodes and austenitic electrodes were used for welding the armor. Only manual welding was apparently used for fabrication of armor structures. The appendix includes a translation of a German secret tentative specification, dated Aug 10, 1942, for design and fabrication of armor plate. There is also a translation of

Dr. K.L. Zeyen's paper on "The latest developments in welding electrodes for armor fabrication", delivered at the third meeting of the subcommittee on Armor Steel, Prague, May 22, 1944. Diagrams, photographs and drawings illustrate the report.

PB 2428. REPORT on steel metallurgy at Messerschmitt in Oberammergau and Garmisch-Partenkirchen. Microfilm, unread. Oct 1936-May 1944. 636 p. Price: Microfilm-$6.50 - Enlargement print-$43.00
Collection of research papers and standards of various steels and metal alloys used in the aircraft industry. This report consists of a microfilm reel of publications dealing mainly with the testing of materials and their properties; they have the following titles: (1) (a) On the creep behavior of some aluminum alloys at higher temperatures (b) On the creep behavior of some heat resistant iron materials at higher temperatures. 46 pages. (2) Manual on materials for aircraft. This is a set of twenty leaflets on standards and applications of various steels. Attached are a few pages from the Messerschmitt Company on change of a certain material for the replacement of highly resistant steel sheets by sheets made from inferior alloys or carbon steels. (3) Unalloyed cold rolled strip steel with high resistance. This steel was produced by Witkowitzer Bergbau und Eisenhütten-Gewerkschaft. (4) The tensile properties of driving gears made from Cr-Mn and Cr-Mo-steels. 67 p., 35 figs., 10 tables. (5) Endurance of nonwelded and welded Cr-Mo-steel tubes under stress. 19 p., 14 figs., 2 tables. (6) Endurance and fatigue resistance of butt-welded Cr-Mo steel pipes under tension-compression strain. 11 p., 6 figs. (7) Experiments on the metal-arcwelding of thin sheets of Cr-Mo-steel. 31 p., 15 figs., 6 tables. (8) The influence of long time annealing on some properties of nonformed, cold drawn, nonrusting Cr-Ni-steels. 34 p., 36 figs., 2 tables. (9) The influence of production and forming of the blanks on the durability of spur wheels of modulus 3. 32 p., 33 figs., 2 tables. (10) Report of a meeting of the committee for material problems section on "valve springs" at Düsseldorf on Oct 26, 1937. 24 p. of lectures and discussions on various testing methods. (11) Studies on butt welded joints made with aviation material 1620. 34 p., 29 figs., 3 tables. (12) Endurance and fatigue resistance graphs for rod-shaped construction parts made from Cv-Mo-steel, Duralumin, Hydronalium and electron. 24 p., 18 figs., 1 table. Hydronalium is the collective name for a series of aluminum alloys manufactured by the I.G. Its main elements are 5% magnesium and 1% silicon; and there are additions of about 0.1% titanium and 0.18% beryllium. These alloys are also discussed in paper (1) (a). (13) The permanent creep strength of steel and iron alloys. 66 p., 32 figs., 13 tables. Based on the literature a definition of the permanent creep strength is given including a description of creeping and its various values. (14) On the fatigue failure of metallic materials. 53 p., numerous figs., and graphs. (15) Report on the meeting of the committee for materials at Essen on June 20/21 1939. 57 p. Numerous lectures and discussions on various topics. Among them F. Förster's ferrograph is mentioned, with the help of which it was tried to detect erroneously used materials in steel. (16) Two short papers taken from the yearbook 1942 of the German aviation research (deutsche luftfahrtforschung) and (17) Publication of the double-T resistance welding process.

PB 18191. SCHIZ. Instandhaltung und reparatur auf hüttenwerken (On maintenance and repair in iron and steel mills). (MIS VII 65 c12 7001129). 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This lecture (in German) held on May 9, 1944 by Dr. Schiz from Bochumer Verein at Bochum, admits the considerable damage done by air raids, especially to iron and steel mills. He confirms that production of cartridges at that time was reduced by 40% and that the slowdown in repairs and maintenance is growing rapidly. The report also contains detail on the utilisation and abilities of foreign workers in the iron industry.

PB 20664. SKORSKI, E. Some aspects of German work on high temperature materials. (BIOS Final Rept 272, Item 21). Feb 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes interviews with Germans regarding the use of ceramics for rotor on stator blades. The use of quarts, Al_2O_3 and SiC for this purpose was discussed with Dr. Max Bentele of Hirth-Motoren (Stuttgart). Richard Walther had worked for many years in ceramics and found tantalum carbide as the most resistant to oxidation of all-metallic materials. Beryllium oxide was also very good and he felt that an alloy of tantalum and beryllium carbides could be developed as a super high temperature metallic material. He had also developed an alloy that was very resistant to oxidation and had good welding properties (55% Co, 41.5% Cr, 3-5% Si, 0.5% C). In the production of spinels, he stated that the oxides used in their manufacture must be amorphous and not crystalline. Also interviewed were Dr. Schütte of M.A.N., Augsburg, regarding turbine blades, and Doctors Eugen Ryschkewitsch and R. Kieffe, regarding heater elements for 1400 - 1700°C. The diagram attached shows the processing of turbine blades according to Ernst Heinkel, A.G., Werk Hirth-Motoren, from a special "Chromadur" steel.

PB 9027. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur herstellung von sauerstofffreiem kupfer. (A procedure for the manufacturing of copper which is free from oxygen) German patent application T57071 VIa/40d, March 16, 1942, rejected. Original inventor: Woeckel, 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 23348. U. S. STRATEGIC BOMBING SURVEY. Hildesheim Branch of the Vereinigte Deutsche Metallwerk-Halbzeugwerke GmbH, Hildesheim, Germany. (Rept 21; Light Metals Plant Rept 1) Oct 1945. 57 p. Price: Microfilm - $1.00-Photostat - $4.00
This report contains a summary of information regarding the above plant and the effects of allied air raids on it. With 81 aluminum alloy plants in Germany, the Hildesheim works was one of the largest light metal casting foundries. It also contained the third largest magnesium alloy casting foundry in the country. Its principal products were castings for open and closed cycle aircraft engines. A total of five air raids caused varying degrees of damage to the plant. The raid of July 29, 1944 caused a loss in production capacity of about 20 percent. Production was resumed in two days and full repair was completed in eight weeks. The raid of March 22, 1945 completed halted production and operations were not resumed after that date. This was largely due to disruption of gas and electric power lines by raids on the nearby areas. Information regarding products, equipment, labor force, ownership, production losses, and air raids is given under the headings: 1) Summary; 2) the plant and it function in enemy economy; 3) attacks, consisting of a table showing date of raid, number and type of planes, number of bombs dropped, etc.; 4) effects of bombing; 5) intelligence check, which consists of check with information given to bombing commands previous to raids; and 6) exhibits, which include graphs of data on monthly and annual production of principal products, gas and electricity consumption, monthly employment trend; chart of corporate organization, diagrams showing plant layout and bomb hits of the two raids; and aerial photographs.

PB 23367. U. S. STRATEGIC BOMBING SURVEY, Hoesch A.G., Hüttenwerk Dortmund, Dortmund, Germany. (Rept 75; Heavy Industries Plant Rept 8) Oct 1945. 117 p. Price: Microfilm - $1.50 - Photostat - $8.00
This steel plant covers an area of nearly a square mile and is a completely integrated steel plant which accounted for 2.6 percent of the German ingot production in 1943. The finishing mills produced a sizeable proportion of plates which was considered an important item in the German war economy. The first damage of consequence to the plant was caused by the two RAF raids in May 1943. The attacks of May 1944 had only a minor effect on the plant, but the September and November 1944 attacks reduced operations to such a low point that the 1945 operating rate rarely exceeded one percent of capacity. Information regarding location,

the function of the plant in the enemy economy, ore and fuel supply, production data 1938-1944, air raid attacks, the effects of bombing, personnel losses, production losses, bomb damage protection, rate of recovery after raids, vulnerability, and a comparision of pre-raid information regarding the plant with facts found in the investigation, are included. The report also contains a map of the Rhenish-Westphalian iron and steel district, data on the consumption of raw materials, production of pig iron, ingots, semi-finished steel, rails, structurals and bars, heavy plates, sheets, tinplate, forgings, slag and cement; employment statistics; plant losses; tabulated information on raids in the Dortmund area; photographs; and a map of the plant layout.

PB 22347. U. S. STRATEGIC BOMBING SURVEY. The light metal industry of Germany. (Rept 20) Nov 1945. 202 p. Price: Microfilm-$2.50 - Photostat-$14.00
Part I deals with aluminum. Beginning Oct 1944 Germany's requirements for aluminum exceeded her output. By direct attack she lost about 40,000 tons of primary aluminum; by indirect attack her production dropped from a maximum of 25,200 tons in Aug. 1944 to 15,700 tons in Dec. 1944 to 5,700 tons in Feb. 1945. However, this probably had no effect on the German war effort or allocation of materials to vital services or on quality up to the end of the war. Germany had sufficient reserves of aluminum and bauxite to carry on beyond that time. The evidence at hand is not sufficient to determine what type of direct attack caused the greatest overall production loss. Wherever an electrical installation was hit at an aluminum plant, production was seriously reduced for many months. The branch of the aluminum industry most susceptible to attack was aluminum manufacturing because this depended a great deal on power supply. The alumina producing plants were less susceptible because the equipment was massive. The bombing of power plants which supplied current to Germany's network or grid system would have had disastrous effects on aluminum production. Germany's grid system of power distribution worked against her interests. A power failure at one point in the grid would affect power allocation in many other places. Attacks on Germany's transportation systems would have had more immediate effects than attack on her power network. It is reasonable to conclude that attacks on network power plants first and transport second would have achieved most success for effort expended. It was not considered practical to provide protection for a whole plant because a plant seldom was so completely destroyed that it could not be repaired in a short time, unless transformers were struck. Sensitive apparatus were protected by blast walls, or similar means. In the light of German experience and the development of new weapons, aluminum plants should be underground. If that is impractical, the vulnerable elements of the plant should at least be below surface level. Multiple systems of transportation without a common bottleneck should be provided. If the country has an excess of power, the grid system is good insurance. If it lacks power, independent power stations in large numbers would be advisable. Part II deals with magnesium. The magnesium reduction industry in Germany was never bombed although forging, casting and fabrication plants were hit indirectly through area raids or objective attacks against neighboring plants of other categories. The German magnesium reduction industry was the source of about 96 percent of its magnesium and consisted of only four plants. Denial of the magnesium supply would have forced an immediate and complete substitution program effecting the production of incendiary bombs, aircraft, and engine parts. It is likely that a satisfactory substitute material was available for manufacture of incendiary bombs, and that aluminum alloys could have been substituted in the manufacture of aircraft and engine parts. Tables, graphs, diagrams and references are appended.

PB 23086. VOGT, F. R. and HUEBOTTER, H. A. Silver solder for high temperature service. (U. S. Naval Tech Mission in Europe Tech Rept 553-45) Oct 1945. 7 p. Price: Microfilm - 50¢ - Photostat - $1.00
The development by Junkers of a solder composed of 85% silver and 15% manganese called "silma" for joining austenitic steels in high temperature applications such as gas turbine blades is described. The material has high strength up to 850°F. and avoids the harmful intercrystalline corrosion of austenitic steels caused by copper and copper containing alloys. The investigators state that of all metallurgical developments in connection with German gas turbine activity the silver-manganese solder herein described is likely to have most significance for possible American use; that it was almost the only German metallurgical development not predicted on material shortages of a kind and urgency that do not prevail in the United States. It is the further opinion of the investigators that while American gas turbine blade materials far surpass those used in Germany, this German solder appears to be superior for high temperature use with austenitic steels to any material previously available in the United States and that it should find considerable usefulness not necessarily for fastening turbine blades alone but for general joining of stainless steel in high temperature applications such as heat exchangers, exhaust manifolds, gas turbine sheet metal parts, chemical equipment, etc. The following treatment is presented: The properties of the solder, metallurgical reasons for composition, manufacture, methods of use and appropriate fluxes. An appendix mentions personalities involved in the development of the solder.

PB 20276. VON KÁRMÁN, THEODORE. On the propagation of plastic deformation in solids. Progress report. (NDRC Rept A-29; OSRD Rept 360). Jan 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Although the propagation of plastic deformation or permanent set is of fundamental importance for the interpretation of impact and penetration problems in which the stresses exceed the elastic limit of the bombarded material, the present treatment is perhaps the first attempt to compute the stress and strain caused by impact beyond the elastic limit. The method presented may possibly open the way to a systematic interpretation of a great many impact and penetration problems in which plastic deformations of beams, plates, and armor are involved; and if the stress-strain relation of the material is known, may lead to a prediction of the critical velocity causing rupture. A graph is included.

United States

PB 20275. BOHNENBLUST, H. F. Propagation of plastic waves; a comparison of reports NDRC A-29 and R.C. 329. (NDRC Memo A-53M; OSRD Rept 910). Sep 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report, from California Institute of Technology, compares the calculations of von Kármán set forth in "On the propagation of plastic deformation in solids" (NDRC Rept A-29, Jan 1942, PB 20276) with the calculations presented by G. I. Taylor in "The plastic wave in a wire extended by an impact load" (British Research Committee Rept 329, Jun 1942). Correctly interpreted, both solutions are identical.

PB 22901, PB 22902, PB 22903, and PB 22904. BRAY, J. L. and others. Production of a lead coated steel as substitute for tin plate and terne plate. (War Metallurgy Committee Res Repts M-22, M-37, M-61 and M-89) Progress reports, Dec 1, 1942 - Sept 1, 1943. Final report, Dec 31, 1943. Apr 1943 - May 1944. Price of each report as listed below.

PB No.	Pages	Price: Microfilm	Photostat
22901 (M-22)	13	50¢	$1.00
22902 (M-37)	22	50¢	$2.00
22903 (M-61)	13	50¢	$1.00
22904 (M-89)	45	50¢	$3.00

The final report (PB 22904) combines data presented in progress reports (PB 22901 - PB 22903), and is based upon experimental work done at the Engineering Experiment Station, Purdue University, under contract with the War Production Board. The most important accomplishment of the experimental work was the satisfactory coating obtained from a lead bath containing small amounts of zinc. While alloys of lead containing as low as 0.10% zinc yielded adherent coatings, the best results were obtained with a 0.55% zinc (Eutectic) alloy. The lead alloy coating was found to have a greater

corrosion resistance than galvanized sheet when tested in a Weatherometer, and in addition, a corrosion life equal to that of terne plate. In all cases the lead coating was applied to a suitable prepared steel sheet. Steel sheet was also coated effectively from an undezinced lead bath. This lead contained residual zinc from Parke's process refining, and the zinc content was approximately 0.55 percent. The Pb-Zn coatings had two serious shortcomings - softness and unattractive appearance; but the softness was balanced by extreme ductility and superior bending qualities of the coating, and the unattractive coloring was in part redeemed by the spangles which could be obtained at will. The coating soldered well, and had excellent adherence to the base metal. Work done on zinc loss from a lead bath indicated that this loss varied directly with the dipping temperature. (Optimum temperature for dipping from a Pb-Zn bath of 0.55% zinc, had been found to be 340°C.) The loss of zinc was attributed to liquidation and oxidation, but was in part due to the NH_4Cl flux acting as a desincing agent. Some work done on hardenability of lead alloys indicated that a Pb-Te alloy was work hardenable, but little benefits were obtained with a tellurium addition to a Pb-Zn alloy. It was noted, however, that the addition of antimony to a Pb-Zn-Te alloy decidedly changed the character of the spangles An appendix consists of the following tables: I. Operational data; II. Weatherometer data; and III. Operational and corrosion test data. PB 22902 includes in its title the subhead, "Lead coating of steel." Photographic illustrations show effect of low zinc content, spangle on lead coated sheet, dipping unit and other apparatus. Schematic drawing of lead dipping machine and graphs are also included.

PB 22647. BROWN, W. F., JR. Hot forming of aluminum alloy parts: Part IV, Analysis of stress and strain states in circular and elliptical bulging. Final report. (OPRD Rept M-207) July 1945. 25 p. Price: Microfilm-50¢ - Photostat-$2.00

This is the concluding report of a series of four on hydraulic bulging at elevated temperatures and represents the compilation of results on hydraulic bulging of a number of important aluminum alloys at 75° F., 250° F., and 375° F., for a circular and several elliptical die shapes. The bursting pressures for the various tests reduced to that for a unit bulge show that, as might be expected from the theory of elasticity, a circular membrane is considerably stronger under hydraulic pressure than an elliptical membrane. The effect of temperature on the bursting pressure increases with increasing ellipticity. The only relation discovered appearing to possess fundamental significance was that the forming limit is related to the ductility for circular and nearly circular bulges. This is contrary to what could be predicted from present theoretical knowledge and indicates that the necking condition may become indeterminate when applied to a bulge. No fundamental conclusions regarding the effects on the metal properties of varying biaxiality between 0.5 and 1.0 were revealed by these tests. Relations between the fundamental variables of the bulging process appear extremely complex and are not explained by any present theory. This work was carried on at the Case School of Applied Science. The results are discussed and are also shown in tabulated form and in plotted curves. A short bibliography is included. See also PB 22640-22641, and PB 22643-22644.

PB 20272. DUWEZ, POL M. and others. The effect of stopped impact and reflection on the propagation of plastic strain in tension. Progress report. (NDRC Rept A-108; OSRD Rept 988). Nov 1942. 19 p. Price: Microfilm-50¢ - Photostat-$2.00

A comparison is given of the experimental strain-distribution curves for tension impact and the theoretical curves computed on the basis of the von Kármán theory on the propagation of plastic deformations in solids (PB 20276) as extended. The results of three types of test are given for which the theoretical results have been computed on the basis of strain-propagation theory. The results are compared with those based on the approximate solution developed by Taylor; the only important difference in the two curves is found to be the absence of steps in Taylor's curve. Evidence is presented to show that the von Kármán method of computing reflection and stopping of plastic waves is substantially correct. Curves and bibliographic references are included. The work was carried out by the California Institute of Technology.

PB 20273. DUWEZ, POL M. and others. The influence of specimen length on strain propagation in tension. Progress report. (NDRC Rept A-108; OSRD Rept 987). Oct 1942. 39 p. Price: Microfilm-50¢ - Photostat-$3.00

This report describes experiments made on an SAE 1020 cold-rolled steel by the California Institute of Technology for the purpose of studying: (1) The influence of specimen length upon the application of the von Kármán theory of the propagation of plastic strain; (2) the influence of specimen length upon the total energy, total elongation and strain distribution for impact velocities between 0 and 200 ft/sec.; and (3) the influence of impact velocity on the tensile properties of this particular steel. The results of the work show: (1) That the critical velocity observed experimentally agrees with the computed value; (2) that the velocity at which the maximum is observed in curves of total energy vs. impact velocity is independent of the gage length, and that the length of the specimen must be greater than 4 in. in order that a definite maximum may be observed in these curves; and (3) that the total energy-absorbing capacity of SAE 1020 cold-rolled steel increases with increasing impact velocity until the critical velocity is reached. Graphs illustrate data.

PB 20274. DUWEZ, POL M. and others. The propagation of plastic strain in tension. Progress report. (NDRC Rept A-99; OSRD Rept 931). Oct 1942. 90 p. Price: Microfilm-$1.00 - Photostat-$6.00

This report from the California Institute of Technology describes experiments made on metallic specimens to check the von Kármán theory of the propagation of plastic deformation in solids. The results of this work show that the shape of the wave front is more complicated than previously reported because of the change through which the plastic-strain distribution passes during the unloading period. There is definite evidence of a reflection of plastic strain from the fixed end of a specimen of finite length. There is also definite influence of impact velocity on the total elongation and total energy of a specimen 8 in. long. Curves and photographs are included.

PB 23776. KOLUMB, D. L. and OBERLE, T. L. Development of high strength gun steels (OD-34-3). Final report, Jan 19, 1946. (OSRD Rept 6597; War Metallurgy Committee Rept M-649) Feb 1946. 31 p. Price: Microfilm - 50¢ - Photostat - $3.00

The purpose of this investigation made at the Vanadium Corporation of America was to find one or more steel compositions which could be isothermally heat treated in heavy sections to 150,000 to 180,000 pounds per square inch yield strength. Several steels containing between about 2.5 and 5 percent total manganese, nickel, chromium, molybdenum, and vanadium possessed satisfactory yield strength after the conventional water quench and temper treatment in 4 inch section. Steels containing less than about 2.5 percent of these alloying elements were not considered because of low hardenability. Steels containing more than about 5 percent of these elements showed low yield strength and impact strength after the water quench and temper treatment. However, partial isothermal diagrams in the region of the Ms point to 200°F. above the Ms point indicate that the isothermal transformation might be sufficiently delayed to permit the utilization of an isothermal heat treatment in heavy sections. Partial isothermal diagrams disclose that the steels which contained about 2.5 to 5 percent of the alloying elements and had acceptable tension and impact properties after the conventional water quench and temper treatment may transform too rapidly to permit satisfactory isothermal treatment in heavy section. Work on this project was discontinued before selected compositions could be isothermally treated in large sections but the report contains specific recommendations as to steel compositions and heat treatments for future investigations. Tables, ASTM graphs of hardness data and isothermal transformation diagrams are included.

PB 22869. FIREMAN, H. L. and others. The set added to compressed cylinders after impact. (NDRC Armor and Ordnance Rept A-258; OSRD Rept 3331) Mar 1944. 23 p. Price: Microfilm - 50¢ - Photostat - $2.00

When the load applied to a compressed specimen is removed, plastic deformation does not cease immediately. The additional deformation is found to be negligible in most cases that are of interest in the practical use of copper crusher gages. This is true not only when a load which has been applied directly to the specimen is removed, but also when a load which has been applied indirectly is removed (that is, when it has been applied to a hammer or plunger and transmitted to the specimen). This second situation occurs in a pressure gage of the type in which a copper crusher cylinder is used to determine pressure in a gun. Here the pressure produced in the explosion is transmitted through a steel plunger to the copper cylinder. The set of the copper is measured to determine the gun pressure. The behavior of the material after impact was investigated from both an energy and a wave propagation point of view. It was found that both the potential and kinetic energy of the material contribute to the added set, and that the added set found by the energy method agrees exactly with that found by the wave method. Quantitative results when an annealed copper cylindrical specimen and a steel cylindrical plunger were tested are given. Curves and a list of symbols are given.

PB 19479. HOWLETT, R. M. Heat treatment of high tensile cast iron. (Rock Island Arsenal Lab Rept 39-815) Mar 1939. 22 p. Price: Microfilm-50¢ - Photostat-$2.00

Samples of ten heats, each consisting of one broken section of a transverse test bar were furnished by the Rock Island Arsenal foundry for the tests described and discussed in this report. The object of the investigation was to determine the effect of heat treatment on high tensile cast iron containing .32 to .40% molybdenum. Among the findings were the following: The relief of internal strains by heating at 900°F. produced little change in the properties of these irons; the iron hardens uniformly when heat-treated by an oil quench and draw; an oil quench from 1560°F. and a draw of 1000°F. will improve the tensile strength from 20 to 50% and increase the Brinell hardness from 25 to 45%; as a class, the low carbon, high silicon irons poured from a high temperature show the greatest percentage improvement in tensile strength; and in general the physical properties, as cast, vary directly with the molybdenum and inversely with the carbon plus one-third silicon content. Tabulated data, plotted curves, a short bibliography, and photomicrographs are included.

PB 22892, PB 22893, and PB 22894. HOYT, S. L. and others. Non metallic welding backup strips for armor plate joints (OD-82). Progress reports, Nov 1943, Dec 1943. Final report, Jan 1944. (OSRD Repts 2080, 3238 and 3398; War Metallurgy Committee Repts M-159, M-200, M-220) Nov 1943, Feb 1944, Mar 1944. Price of each report as indicated below:

PB No.	Page	Price: Microfilm	Photostat
22892	56p	$1.00	$4.00
22893	35p	.50	$3.00
22894	95p	$1.00	$7.00

The Final Report (PB 22894) combines data presented in previous progress reports (PB 22892 and PB 22894) on the problem of developing nonmetallic backup strips for welding of steel, particularly armor plate, in the flat position. This investigation was made by the Battelle Memorial Institute under NDRC contract. The primary purpose of the investigation was to eliminate bare copper or steel backup strips in grooved weld joints. When steel is used, it is welded in place, is hard to remove, and the characteristics of the weld metal are changed. Copper has been used instead of steel and has the advantage of easy removal when compared with steel. Disadvantages of copper backup strips, however, are possible copper pickup in the weld metal, chilling and possible cracking of the root weld metal, and difficulties in fitting, as well as the tying up of strategic copper. A ceramic material is needed which will not cause pickup or inclusion of foreign materials in the weld which will give a good contour to the back side of the weld, which will be able to take care of poor fit up, and which can be used with either austenitic or ferritic electrodes. It is desirable also that the material will not affect the properties of either the electrode coating slag or the weld metal. Information on the use of nonmetallic backup strips on single-vee welds with varying root gaps also was desired for possible applications in fields other than welding of armor plate. Consideration was given to backups which might be used only once, and also to those which might be used repeatedly. Electrode coatings or electrodes used in this work were, as follows: Grade V, Class I Austenitic electrode (McKay Modified 18-8); NRC-2A electrode (Harnischfeger AW2C); E6010 (Arcrods 001); E6011 (Murex A); E6012 (Arcrods 010); E6013 (Arcrods 007); and E6020 (Arcrods 005). Each of these was considered to be representative of its particular class and, in general, similar results might be expected from use of other electrodes in the same class. The use of granular ceramic materials as tamped backups for double-vee butt welds in armor plate joints indicated that mixtures with fused mullite or P.B. Sillimanite as base materials were the most satisfactory. McKay Modified 18-8 and Harnischfeger AW2C electrodes were used in these tests. The best wash for copper bars used as backups for single-vee butt welds in structural steel was wollastonite (calcium silicate, $CaO \cdot SiO_2$). The best results were obtained when the wollastonite was minus 100- to plus 150-mesh size and the coating was applied to give a dry weight of 0.3 to 0.4 gram per square inch. Details of the composition of satisfactory wollastonite coatings and methods of application are given in the appendix of the final report. Good results also were obtained with coatings of Formax, open-hearth finishing slag, open-hearth flushing slag, and crushed insulating brick on copper bars. Specific compositions are given in the appendix. A number of preliminary tests of refractories without metal backing were made by employing nine-inch straight brick as backups. None were entirely satisfactory, although Carbofrax (silicon carbide) brick appeared to be the most promising in these tests. Results obtained with P.B. Sillimanite, Alunden 256, Missco, and Jay Boo (all of higher alumina content than ordinary fireclay brick) indicated that they had some promise. The electrode slag appeared to react with all of the bricks tested; the least reaction was obtained with the silicon carbide brick. Use of wollastonite or open-hearth slags as washes on brick gave better results than were obtained on uncoated bricks. Diagrammatic sketches, photographs and tables are included.

PB 23223. KRAMER, I. R. and others. Study of brittleness in an 18 inch class B armor plate by means of high velocity fracture test. (Naval Res Lab Rept M-2560). Jun 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00

The ductility of specimens taken from position throughout the cross section of an 18 inch class B armor plate has been studied by means of high velocity fracture test. The "as received" specimens were found to have a much lower ductility than those that were reheat-treated. An embrittling phenomenon that occurred during tempering lowered the ductility to a far greater extent than the presence of bainite. An hypothesis, based on the formation of austenite during tempering, has been advanced to explain the embrittling during the tempering cycle. A finger specimen, a schematic cutting diagram, and graphs are included.

PB 23484. KRISCH, ALFRED. The creep strength of nickel-chromium cobalt and iron-chromium cobalt alloys. (United Kingdom. Ministry of Aircraft Production. RTP Translation 2567) n. d. 28 p. Price: Microfilm-50¢ - Photostat-$2.00

This is a thesis published in Mitteilungen of the Kaiser Wilhelm Institut, Düsseldorf, Vol. 27, 1944, No. 1, Report 456. Creep strength tests were carried out on an alloy containing, in addition to small quantities of the usual non-associated constituents, about 0.08% C., 12% Cr., 21% Co, 40% Ni, and, of each of the following: 3.5 to 4% Mo, W and Ta. These were tested in annealed, hot-rolled and cold conditioned states, at temperatures ranging from 600° to 800° C. Tests were also made on four steels in the forged state at 800° C. The tests are described in detail. Discussion of methods for ascertaining creep strength values, and me-

chanical and structural properties of the materials and of the results of the tests are included. Data on elongation is given in tables and plotted curves. A list of references is also included.

PB 20690. McQUAID, H. S. Lead lining of 75 mm gas shell and boosters by the use of lead fluoborate plating solution. (Edgewood Arsenal Chemical Div Rept 84) Dec 1941. 68 p. Price: Microfilm-$1.00 - Photostat-$5.00
Some of the shells used during the war that were lined electrolytically with lead were unable to hold certain corrosive gases. This report describes a superior lead plating solution recommended by the Bureau of Standards. The procedure produced a better and more even plate and required less plating time. Diagrams of the plant, plating stands and equipment and test data are given.

PB 22639. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part I, Hot roll forming. Progress report: Dec 15, 1943 to Mar 15, 1944. (War Metallurgy Committee Res Rept W-105). Jun 1944. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This is the first progress report on the investigation of hot forming of aluminum alloy parts undertaken at the Case School of Applied Science. The purpose of this investigation was to determine whether improvements in production methods can be derived from forming at specific room and moderate elevated temperatures. A number of aluminum alloy strips, 0.040 inch thick, were roll formed (in five passes) into a hat section incorporating bend radii of 3/4t, 1t, and 1-1/2t, at room temperatures and temperatures up to 250° to 360°F. It was found that all the annealed alloys roll formed satisfactorily at all temperatures. The room temperature aged alloys, clad R301W, and bare 618W roll formed satisfactorily, while bare 24ST cracked at all radii for all temperatures. Of the artificially aged alloys, only bare 61ST could be roll formed at room temperature without cracking. Other findings are also given. The experimental procedures are described and illustrated by drawings of the roll passes. The results are shown in tables and in time-temperature curves. See also PB 22642, PB 22645-22646, PB 22648-22649, and PB 22671.

PB 22640. SACHS, GEORGE and others. Hot-forming of aluminum alloy parts: Part I. Circular hydraulic bulging. Final report: Mar 16, 1944 to Jun 15, 1944. (War Metallurgy Committee Res Rept W-125) Aug 1944. 102 p. Price: Microfilm-$1.50 - Photostat-$7.00
This report presents the results of tests made at the Case School of Applied Science on forming sheet to failure by means of oil pressure restricted to a circular area. Such circular bulges exhibited stretching, which in both the radial and circumferential directions, gradually increased from zero at the hold-down surface to a maximum value at the pole. Fracturing began in the vicinity of the pole and yielded various separation patterns; however, the strain distribution was affected by the failure only in the immediate vicinity of the fracture. The bursting pressure, the maximum "uniform" stretch at the pole (crown), excluding the break, and "the reduction in thickness" at the fracture were considered as the important metal characteristics supplied by such tests. The effect of temperatures between 350° F. and approximately 500° F. on these characteristics of a number of aluminum alloys were determined. As a result of experiments described in this report it was concluded that decided improvement in formability by the application of temperatures below 400° F. can be expected (a) for any annealed alloy and (b) for heat-treated alloys of the alloy types represented by 75S and R30l. On the contrary, the formability of all heat-treated conditions of 24S (24ST, 24SRT, 24ST61, 24ST86), both bare and clad, appeared to change only slightly on increasing the temperature within the limits where their properties can be expected to be only slightly affected by the elevated temperature. Included are tabulated results, photographs and drawings of equipment and circular bulges, a bibliography, diagrams, and numerous plotted curves. Appendix II contains detailed information regarding the procedure for applying photo-grid to aluminum sheet, accompanied by a brief bibliography. The principle of this process consists in applying a thin layer of emulsion to the surface of the sheet, exposing this emulsion by arc light through a gridded celluloid negative, and finally dyeing the exposed emulsion in a Diamond type dye solution. The result is a black line grid on a light (aluminum surface) background. See also PB 22641, PB 22643-22644 and PB 22647.

PB 22644. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part II, Elliptical hydraulic bulging axis ratios 0.88 and 0.60. Final report. (OPRD Rept W-199) Jun 1945. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
Tests on forming elliptical bulges having ratios of the minor to the major axis of 0.88 (7:8) and 0.60 (3:5), respectively, by means of hydraulic pressure, yielded results which paralleled those obtained previously on hydraulically formed circular bulges (See PB 22640). The only exceptions were the alloys 24ST, bare, and 24ST, clad, which both exhibited comparatively low forming limits for the 0.60 ratio bulge when the testing temperature exceeded 400° F. The values of the forming limits for the bulges of ratio 0.88 were usually smaller than, but in a number of instances approximately equal to, those observed in circular bulges. However, for an axis ratio of 0.60, the forming limits were considerably lower than in circular bulging. This report of work carried on at the Case School of Applied Science contains a description of the experiment, photographs of typical bulges, drawings of dies, numerous plotted curves, and a brief bibliography. See also PB 22641, PB 22643 and PB 22647.

PB 22643. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part III, Effects of speed and thickness in hydraulic circular bulging. Final report, Mar. 15, 1945. (OPRD Rept W-195) Jul 1945. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
The effect of speed of forming on the forming limits in circular bulging over the range investigated at the Case School of Applied Science was found to have only slight effect for temperatures from room to 375° F. With increasing metal thickness (0.012 to 0.061 inch) the bursting pressure increased approximately linearly, as was expected. The forming limit also increased; however, the effect on this variable differed widely, depending on the alloy and testing temperature. The annealed alloys showed a more pronounced effect of thickness than did the aged conditions. The increase in forming limit with increasing thickness is not easily explained, and would not be expected from the two-inch gauge length elongation in pure tension. Such a phenomenon indicates a departure of the bulge from the membrane theory at appreciable thickness, where the flexural rigidity of the metal becomes appreciable. The material, equipment and test procedures are described and the results are discussed. Tabulated results, plotted curves, drawings of testing equipment, and a short bibliography are included. See also PB 22640-22641, PB 22644 and PB 22647.

PB 22671. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part VI, Tapered tensile tests. Final report. (OPRD Rept W-210) Aug 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The purpose of the investigation reported herein was to determine the effect of the taper and of the resulting strain gradient on the longitudinal strain distribution and the necking strain in aluminum tensile specimens of circular cross section. It was particularly desired to investigate the possibility of determining the necking or uniform strain of a bar with uniform cross-section by extrapolation of the results to zero taper. Tensile tests on bars possessing various tapers indicated that the uniform elongation, or necking strain, of a material may be obtained by a method of extrapolation to zero taper. It was also observed that localized deformation began in tapered tensile specimens at loads as much as five percent below the maximum load. This report prepared at the Case School of Applied Science in-

cludes description and photograph of the test specimens, description of the equipment and experimental procedure, discussion of the results; plotted curves showing longitudinal strain distribution and other results of these tests; and a bibliography. See also PB 22639, PB 22642, PB 22645-22646, and PB 22648-22649.

PB 22641. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part VII, Mechanical die bulging and stretching. Final report: June 16, 1944 to Sep. 15, 1944. (OPRD Rept W-167) Jan 1945. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report contains the results of tests conducted at the Case School of Applied Science (1) to determine whether significant improvements in production methods for the mechanical stretching (uniaxial and balanced biaxial tension) of aluminum sheet could be derived from forming at moderately elevated temperatures; and (2) to determine the relation between hydraulic and mechanical (die) forming at elevated temperatures, and if possible a correlation between the stretch test, in particular, and the results of tensile tests at elevated temperatures. The experiments are described and the results discussed in detail. It was found that for a few alloys some degree of practical advantage was obtained by elevated temperature forming with a draw die in a double-action press, but that for most of the alloys and alloy conditions (particularly 24S) little, if any, increase in average elongation was attained by hot forming the parts investigated below 400° F. The general information derived from hot hydraulic bulging is not applicable to present day commercial forming processes other than rubber forming. While it is difficult to separate and quantitatively evaluate the effect of the numerous variables encountered in die forming, it appears that a detailed analysis of strain distribution with the object of determining the most favorable strain combination is justified for the forming of a difficult commercial part. Photographs and drawings of bulging and of stretching tools; plotted curves showing strain distribution for mechanical circular bulging and for mechanical stretching of various alloys at various temperatures; and a bibliography are included.

PB 22642. SACHS, GEORGE and ESPEY, GEORGE. Hot forming of aluminum alloy parts: Part VIII, Stretch-forming of a sheet section. Final report. (OPRD Rept W-172) Jan 1945. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
The results of tests of hot stretch-forming a sheet section (U-channel) on a roto-stretcher are presented in this report prepared at the Case School of Applied Science. It was concluded that with increasing temperatures, the forming of this aluminum section became increasingly more dependent on a narrowing optimum range of prestress. At temperatures where the stress-strain curves show a decrease in tensile load shortly after the yield point (low "uniform" elongation), the specimens failed locally in tension due to the externally applied prestress. In addition, any non-uniformity in heating a local area resulted in non-uniform strains in these portions of the section. These tests, therefore, indicated that for most parts to be stretch-formed, the application of heat would decrease rather than increase the commercial forming limits. The discussion of the experiments and results is accompanied by drawings and diagrams of the testing equipment, tabulated data, and plotted curves showing maximum strain distribution at various temperatures. A bibliography is also included. See also PB 22639, PB 22645-22646, PB 22648-22649, and PB 22671.

PB 22645. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part IX, Roll forming. Final report. (OPRD Rept W-203). Jun 1945. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
This report contains the results of experiments carried on at the Case School of Applied Science on roll forming aluminum alloy sheet at elevated temperatures up to 350°F. into hat sections with various radii. With increasing temperature of forming, the alloys 75ST and R301T showed pronounced improvement in formability. The artificially aged conditions of 24S (24ST8) also exhibited a slight reduction in bend radius with increasing temperature, while the room temperature aged 24ST, was practically unaffected by elevated forming temperatures. These experiments indicated that for the artificially aged alloys, suitable forming temperatures can be chosen which will permit forming to smaller radii with little if any decrease in metal properties. For most alloys, however, it is important that a method of heating be employed which does not heat the metal above the temperature at which it is formed nor subject it to the forming temperature for any extended period of time. Photographs and drawings of the roll forming equipment, tabulated results, a short bibliography, and plotted curves showing the effect of forming temperature on the minimum bend radii of the tested alloys and other results of tests are included. See also PB 22639, PB 22642, PB 22648, PB 22648-22649, and 22671.

PB 22646. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part X, Bending of high strength alloys at room temperature. Final report. (OPRD Rept W-208) Jul 1945. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
The results of bending tests on the high strength aluminum alloy 75S in various conditions of heat treatments are presented in this report prepared at the Case School of Applied Science. In addition, a limited number of tests were made on the alloys 24ST81, 24ST86 and R301T. The effects of metal thickness, of specimen width, and of the edge condition were shown to be of considerable magnitude, being large enough to conclude that commercial production should benefit from a consideration of these variables. Among the minor variables investigated were the effect of grain direction, cladding and tool clearance. The detailed discussion of results is accompanied by photographs and drawings of testing equipment and specimens, numerous plotted curves, and a short bibliography. See also PB 22639, PB 22642, PB 22645, PB 22648-22649, and PB 22671.

PB 22648. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part XI, Bending at elevated temperatures. Final report. (OPRD Rept W-208) Aug 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The hot bending properties of the aluminum sheet alloys 24ST, 24ST86, 75ST, and R301T were investigated at the Case School of Applied Science and results are discussed in this report. It was shown that the alloy 24ST is not appreciably improved by temperatures up to 400° F. Some variations in results were observed in different sheets of 24ST86, but it appears there may be some improvement in bending properties at 400° F. 75ST and R301T were considerably improved by increasing temperature, until at approximately 275° F. they could be bent to the same radii as 24ST. It was also observed that the edge condition, even as affected by the condition of the cutting tool, is of considerable importance when the part being bent has an almost square cross section. The elevated temperatures appeared to decrease these detrimental effects of edge condition to some extent. A photograph of the equipment, plotted curves and a short bibliography are included. See also PB 22639, PB 22642, PB 22645-22646, PB 22649, and PB 22671.

PB 22649. SACHS, GEORGE and others. Hot forming of aluminum alloy parts: Part XII, Tensile tests on aluminum alloy sheet. Final report. (OPRD Rept W-209) Aug 1945. 117 p. Price: Microfilm-$1.50 - Photostat-$8.00
The results of tensile tests made on strips of various widths and lengths cut from 24S0 and 24ST aluminum alloy sheet ranging in thickness from 0.020 inch to 0.500 inch are presented in this report of work carried on at the Case School of Applied Science. Various shapes of cross section were investigated from square to a width to thickness ratio of 90. In all cases the gage length was relatively long, ranging from 50 to 600 times the sheet thickness. It was found that the factors affecting the necking and fracturing of tensile test specimens were very complex, and often critically important, i. e., small variations in these factors have large effects. In particular, small variations along the length in the initial cross section or in the strain hardening characteristics of the material cause a large reduction in the average strain preceding necking, or "uniform" strain. Under ideal conditions of perfect uniformity along the length, the specimen will neck at an average longitudinal strain that is equal to

the 'necking strain', which is a true property of the material, depending only on the shape of the stress-strain curve. The necking, ductility, and biaxiality in the neck of these specimens are discussed in detail. Photographs showing fractures, numerous plotted curves, and a bibliography are included. Appendix I discusses the determination of the principal strains in a surface. See also PB 22639, PB 22642, PB 22645-22646, PB 22648 and PB 22671.

PB 27727. U. S. AERONAUTICAL BOARD. Steel; chrome-molybdenum (4130) plate, sheet, and strip (with amendment 5, May 15, 1945). (Army-Navy Aeronautical Specification AN-QQ-S-685) Jun 1941. 11 p. Price: Microfilm-$1.00 - Photostat-$1.00

PB 21173. U. S. ARMY INDUSTRIAL COLLEGE. DEPARTMENT OF RESEARCH. Iron and steel. Mar 1946. 80 p. Price: Microfilm - $1.00 - Photostat - $6.00
This is a report of a conference of the Iron and Steel Advisory Committee, held on Dec 13, 1945, at the Department of Research, The Army Industrial College as part of a seminar. The following questions served as a guide for the discussion of the industrial mobilization problems of the industry: 1. Assuming that our future military requirements for iron and steel are the same as the maximum rate for World War II, and that our post-war rate of consumption is equivalent to about two-thirds of this rate (a) what means should be taken to keep the balance of capacity in operable condition to meet a future emergency; and (b) based on World War II experience, how much time will be required to get the balance of facilities ready for full production of (1) mining iron ore, (2) pig iron and coke, (3) steel ingots and castings and (4) semifinished products; 2. Inasmuch as iron and steel scrap is an important source of raw material for the production of steel, (a) how can a dependable supply be assured for a future emergency; (b) what were the lessons learned in World War II concerning its use; (c) can battle scrap be employed economically for postwar uses; 3. (a) What are the quality and quantity of our iron ore reserves? Would you suggest the preservation of the better grades of iron ore for a future emergency, particularly the open-pit Mesabi ore; (b) how much exploratory work on prospective reserves is being done, and how do the tax laws of various states affect this; (c) to what extent will the iron and steel industry have to depend on beneficiating methods - concentrating and sintering - for its supply of iron ore, and how will its increased use affect the cost of production, and what is the time factor involved; 4. During World War II, more alloy steel was required; and, in order to conserve alloys, the national emergency steels were developed; (a) to what extent do you think these will be used in peacetimes, (b) what is your relative and absolute estimate of peacetime consumption of (1) alloy steels, (2) carbon steels; 5. What is being done to maintain special facilities such as plate and forging mills built during World War II to meet the emergency requirements for a future emergency? will government-owned facilities be absorbed by private industry? to what extent will this be affected by government policy; 6. In view of the concentration of the industry and the developments of new weapons, what would be your suggestion about dispersion of the industry? How about new plants; 7. Do present technological developments indicate possible changes in use of processing raw materials; 8. To what extent will anticipated postwar uses and the substitution of other materials affect the requirements for steel? In the competition between materials, what is the steel position as compared with light metals, plastics, plywoods and others; 9. What proved to be the toughest iron and steel production problems in World War II (a) in manufacturing, (b) in meeting requirements.

PB 23169. U. S. ARMY INDUSTRIAL COLLEGE. DEPARTMENT OF RESEARCH. The magnesium industry and industrial mobilization. Apr 1946. 56 p. Price: Microfilm - $1.00 - Photostat - $4.00
This is a report of a meeting of representatives of the magnesium industry and members of government agencies interested in magnesium production at the Army Industrial College, March 8, 1946, to consider the future resources and development of the industry and to discuss the requirements of the Army and Navy. Among the topics discussed by various speakers were the following: The development of the industry during World War II; the vast raw resources; the salt water reduction process and the ferrosilicon process; need for electric power; interest of the government in developmental work; use of magnesium; production of by-products; costs of magnesium production and fabrication; Governmental controls; cooperation of the industry and Government through research; Government specifications, etc.; maintenance of a definite capacity in stand-by condition; and stockpiles.

PB 23775. U. S. NATIONAL RESEARCH COUNCIL. WAR METALLURGY COMMITTEE. Proposed research project: Rivets and rivet steels. Advisory report, Dec. 15, 1942. (Rept M-42; OSRD Rept 1163) Jan 1943. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
As a result of a request from the office of the Navy Department's Coordinator of Research and Development, this report was prepared by the War Metallurgy Committee. It was considered that the principal problem involved in this research is the metallurgical problem of developing a superior rivet steel or steels. The proposed alloy steels suggested by the Navy were no longer feasible on account of the changes in the relative availability of alloying elements. It seemed quite probable that a superior rivet steel could be developed using appropriate combinations of carbon and manganese for each rivet size or that less sensitive combinations than carbon and manganese may be found within the available supplies of strategic alloying elements. The War Metallurgy Committee offered to establish the necessary research project at any one of a number of metallurgical laboratories that are now available, if the Navy believed the research to be desirable. It was estimated that the cost of this research program would be approximately $20,000, and that six months would be required to complete the laboratory work.

ORDNANCE AND ACCESSORIES

British

PB 22160. TAYLOR, RICHARD B. Evaluation of the British flying spray tank, Nov. 25, 1942 to Dec. 12, 1942. (CWS Tech Div Memo Rept 536) Feb 1943. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
Report describes tests to evaluate the British Flying Spray Tank as designed for the dispersion of liquid chemical agents from airplanes. The tests showed that practically all of the tanks tested acted unsatisfactorily and one of them exploded almost immediately after starting to spray. The ratio of weight of filling ejected to the original filled weight approximated 40%. It was recommended that the tanks tested should be expanded and other tanks be developed along given lines. Two diagrams of spray tanks are attached, one British and the other tank body M69.

Bulgarian

PB 25163. POPOFF, M. KYRILLE. About the yawing movement of projectiles. (BIOS Halstead Exploiting Centre Rept 32) 1936. 55 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is a translation by Herms of an article by Professor M. Kyrille Popoff, of the University of Sofia, which was received by the University of Paris, and published in "Mémorial de l'Artillerie française" Vol. XV, Nr. 3, 1936. He reviews and discusses the equations and formulae developed by others in this field of ballistics. Among those he discusses are Bursio, Volterra, Maywski, Dirichlet, and D'Adhemar. Chapter I deals with the differential and integral equations of the yawing movement. Chapter II consists of an examination of the differential and integral

equations of the movement. Chapter III contains considerations on the physical nature of powers of lateral friction. Chapter IV discusses the establishment of the equations and integration of the equations of the problem.

German

PB 25190. BRAUN, GERHARD. Preliminary calculation and evaluation of the trajectories of bodies in flight for the purpose of measuring the aerodynamic coefficients in the region of the velocity of sound. (BIOS Halstead Exploiting Centre Rept 23) Sep 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
The procedure used by the LFA, Brunswick for the preliminary calculation of the trajectories of bodies in flight is described and some results of general interest of systematic calculation of trajectories are presented in this lecture given at the Labour Conference at Freiburg on December 9, 1944. Six different procedures for the evaluation of trajectories are discussed, and a method operating with orthogonal polynomials is acknowledged as the most expedient. The bodies in flight dealt with in this report look more like an airplane than an artillery projectile; they are equipped with rockets. Graphical illustrations and drawings of flying bodies accompany the text. This report is translated from the German. The author was associated with the Institute for Aerodynamics of the Aviation Research Institute.

PB 25296. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. The manufacture of poured explosive fillings for shell. (Halstead Exploiting Centre Rept 10331) Jun 1944. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report presents information on the work of the filling plants, with detailed discussions of the pouring process and the preparation of exploder cavity. The following individual filling methods are discussed and compared: Meissener process, Steinmann-Koch process, pouring with a "Former", Wuhle process, Helbig process, and the Orbe process. Photographs, diagrams and tables are included.

PB 22921. BROOKS, C. E. and others. The loading of ammunition in Germany - explosives, types and character of explosive mixtures and loading methods employed. (Naval Tech Mission in Europe Tech Rept 268-45) Oct 1945. 130 p. Price: Microfilm-$1.50 - Photostat-$9.00
This report is based upon investigational surveys of representative explosives and ammunition loading plants in Germany. It records the types and character of explosives and explosive mixtures (other than propellants) with which German ammunition was loaded and describes the more commonly used loading procedures. Some of the considerations included are: (1) Patent applications for underwater bursting charge and high capacity explosives filed by the Dynamit-Aktien-Gesellschaft; (2) translation of documents, (a) by Dr. Klaembt "TNT pressing plant", (b) by Dr. Debischek "PETN pressing plant"; (3) translation of a document by Dr. Walther Schnarr, dated July 15, 1945, regarding the procedure for loading small projectiles with case explosives accompanied by photographs. Tables, charts, and diagrams are also included.

PB 20416. DEUTSCHE VERSUCHSANSTALT FÜR LUFTFAHRT, BERLIN-ADLERSHOF. Auf die wasserbegrenzungsflächen eines zieles abzuwerfende bombe. (A bomb to be dropped on the water surface adjacent to a target) (German patent application D 91671) Sep. 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This application describes an equilateral prism-shaped aircraft-bomb to be dropped upon the surface of the water near a target, and adjusted so that it will detonate in the vicinity of the target by a fuse set to a predetermined hydrostatic pressure. A drawing is included.

PB 25002. DUNNING, W. J. and LEIGH, L. Dipl. Ing. Alexander Schpolsky. (BIOS Halstead Exploiting Centre Rept 559) Jul 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the interrogation of a Ukranian scientist who had done designing work in Germany before and during the war. Mr. Schpolsky had invented a new method of construction for aircraft, but German engineers did not think it practical. Other inventions by him are: An automatic machine gun which could fire 5000-6000 shots per minute; an improved rocket with the explosive charge in a heat insulated section of the tail and the motors forward; a projectile twenty-five times as long as its caliber; and a shell consisting of three or more parts which separated and exploded independently.

PB 18455. GERMAN. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht L 57 R/1943 über entwicklungsarbeiten für ein flaksperrgerät und forschungen in langwelligen UR. (Report L 57 R/1943 on development studies for an anti-aircraft barrage gun and on research of long wave infra-red rays). (ALSOS Mission, RFR 302 c) Jun 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The report refers to the firing rate and efficiency of the 2 cm type of anti-aircraft gun, various kinds of photographic means are recommended for testing of firing results. Plans are discussed to study the absorption of infra-red rays by steam and smoke by the use of a spectrograph. In German.

PB 22606. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of German 80 mm. mortar shells. Progress report 29, Dec 6, 1943. (OSRD Rept 3115; War Metallurgy Committee Rept M-198) Jan 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
Three inert German 80 mm. malleable cast-iron shells were examined at Battelle Memorial Institute for metallurgical properties, method of manufacture, workmanship, and type and quality of raw materials. A malleable iron casting was used for the body of each of the three mortar shells. The heat treatment for malleabilising the iron was similar to the American black heart process, but differed from the usual treatment in that all of the carbon was not graphitized. The fuze assembly was made of a number of aluminum parts using a strong duralumin alloy in the heat-treated condition and pure aluminum in sheet metal and extruded parts. The booster for the shells was made from a drawn low-carbon steel cup which was attached to a forged adaptor ring by welding in the case of two shells and by brazing in the third. The propelling charge had been packed in a paper tube fitted with a brass cap and a copper primer. The exterior of the shell had been painted with a common red lead paint. Photographs, microphotographs and drawings illustrate the report.

PB 25161. HAUPT, tr. Measuring on R4M on the 10 m launching track, edited by Hutcheon. (BIOS Halstead Exploiting Centre Rept 30) Mar 1945. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
Measurements on the 10m launching track in Luebtheen revealed the trends of velocity and acceleration on the track for rockets at normal temperature and at temperature from -40 to -50 degrees C. The velocity at the end of the track amounts to about 95 m/s at normal temperature and about 65 m/s at -50 degrees C. The corresponding average accelerations are 55 g and 25 g respectively. The simultaneously measured ignition delay lies between 15 and 23 ms at normal temperature (on the average 18 ms) and between 16 and 69 ms at -50 degrees C (on the average 42 ms). The sometimes considerable deviations of the trajectory observed by the measurements were most likely due to premature opening of and consequent damage to the tail-unit on the launching carriage. On two rockets the propulsion chamber was torn off on the track. The rockets were ignited with 12 volts from a battery. Procedure of tests is described and results are presented in tables and graphs. The report is a translation from a German report issued by the DVM Research Institute.

PB 22608. HENDERSON, A. S. and others. Examination of enemy material (OD-113): Metallurgical examination of German 50 mm. mortar shells manufactured in 1939 and 1940. Progress report 26, Nov 30, 1943. (OSRD Rept 3125) Jan 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a report of three inert German 50 mm. malleable cast-iron mortar shells examined at Battelle Memorial Institute for metallurgical properties, type and quality of material, manufacture, and workmanship. It was found that the heat treatment used in malleabilizing was similar to that used in the American black-heart process, but differed from it in that all of the carbon was not graphitized. The treatment resulted in a uniform structure which would be undesirable in castings subject to normal service, but a structure that may be desirable from a ballistic standpoint. The fuze and booster assemblies were made up from a number of aluminum parts, using ordinary duralumin-type alloy in the heat-treated condition and aluminum parts extruded from relatively pure metal in the cold-worked condition. Descriptions of the various parts, discussion of economic considerations involved in manufacturing, photographs, microphotographs, drawings, and tabulated data are included.

PB 25297. HOLT, VON. Brief accounts of 13 rocket inventions. (BIOS Halstead Exploiting Centre Rept 10132) n. d. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
Dr. Von Holt developed the Panzerschreck, a weapon firing a projectile from the shoulder. Compared to the American 8.9 cm Bazooka, this weapon was claimed to have 2½ times the penetrative efficiency with armor-plate and a better accuracy of fire due to an improved design of its guiding fins. A modified Panzerschreck increased the velocity of the projectile from 105 to 150 m/sec. Other developments by Dr. Von Holt described herein are: Multi-stage rockets, an aircraft-carried rocket of 50 and 100 kg. weight, carrier-rockets with subsidiary rocket-projectiles, 5.5 cm. spin-stabilized rockets fired from an automatic rapid-fire launcher, fin-stabilized 5.5 cm. rockets fired by aircraft, high-speed rockets, rocket motors for remote-controlled special weapons, and rockets made of light materials.

PB 23084. HOPKINS, C. A. V-1 and V-2 launching sites and handling equipment. (U.S. Naval Tech Mission in Europe Tech Rept 514-45). Sep 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains a brief description of the V-1 and V-2 launching systems, the location and construction of the sites at Eckfelt and Kaiserseach, Germany, and Hengelov, Holland, and equipment used in handling the missiles. A bibliography of 5 items and 2 photographs are included.

PB 23016. KEMP, JAMES T. Hugo Schneider A.G., steel cartridge cases, Taucha - Leipzig, Germany. (CIOS File XXXI-54, Item 21). Aug 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The monthly output of this plant was 8,000,000 infantry, 25,000 21 cm artillery and 30,000 12.8 cm anti-aircraft steel cartridge cases. Some development work was underway on the manufacture of 20 mm cases from round rod. The steps appeared to be: Shear; upset to square ends and establish a diameter; anneal; clean bonderize; first cupping (an endwise strike); anneal; bonderize; second cupping strike; three draws mouth trim; taper on a press; machine base; bonderize and dust with chalk. Two shoulder arms said to be defense weapons against low flying planes were found; each consisted of a bundle of 9 light tubes, and about 5 feet long, with electric firing device firing salvos of 20 mm rockets. This weapon appears to have been in the development stage and not well known.

PB 23015. KEMP, JAMES T. Langbein-Pfanhauser Werke A.G., Leipzig. (CIOS File XXXI-53, Item 21). 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Subject works are the oldest and largest for building plating generators and all manner of equipment used for electro plating. The firm had been making 7.62 and 8.8 cm cartridge cases under instructions from the German Government. The method of manufacturing cartridge cases is given in this report. For this purpose they installed a very complete press room containing 8 or 9 heavy mechanical presses with incidental cleaning and finishing apparatus. Only two sizes of cartridge cases were manufactured by this firm. They were one of the smaller contractors for these very long cases. It is understood that their production amounted to between 7,000 and 8,000 of each size per month. This firm had recently introduced the cold extrusion process to substitute for the second and third, and possibly the fourth, draws. The drawings in the appendices reveal the position of the cold extruded cup. The position of the cold extruded cup in these drawings does not agree with the statements made to the investigator in the shops. Compositions of steel used in cartridge case manufacture and in cold extruding tools are given.

PB 24993. KOESTER. On the development of trial projectiles (projectiles with discarding sabots, arrow projectiles and projectiles for cone bore guns). (BIOS Halstead Exploiting Centre Rept 590) n. d. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This is an English translation of a German report. Part I describes the development and gives results of experiments with discarding sabots for armor piercing shells for light field howitzers, for the heavy field howitzer 18, for the 12.8 cm. KL/55 shell and for high explosive shells for ground artillery. Since light metals were very scarce in Germany cast silumin was used for the discarding parts, but failed in durability. When steel was used, the parts were apt to fly off in front of the muzzle thus endangering the troops firing the shells. Tests made with shells having the front sabot made of compressed wood were favorable, but were not concluded at the end of the war. Part II describes and discusses the development of arrow projectiles which were based on a design by the research establishment at Peenemünde (Peenemünde Pfeilgeschoss, PPG). These designs were based on wind tunnel experiments. The PPG projectiles for anti-aircraft were to function, as were the sabot projectiles, on impact, and were to be fitted with an explosive charge of approximately 500 g. The attainable shortening of the time of flight corresponds up to heights of approximately 8000 m. to the discarding sabot projectiles with similar guns; at greater heights it becomes more favorable than with the sabot or cone bore projectiles. PPG projectiles for the 28 cm. gun (K 5) are also discussed. In Part III, projectiles for conical barrels are discussed under the headings: (1) For ground artillery; (2) flange (Littlejohn) projectiles for A. A. guns; (3) flange projectiles for K 5; and (4) A. P. shells for conical barrels. An addendum gives further information regarding sabot projectiles. Detailed drawings of these various projectiles and their various parts accompany this report.

PB 25158. MARKS, F., tr. Preliminary technical terms of delivery for 2 cm. self-destroying (s.d.) fuzes, edited by Ansell. (BIOS Halstead Exploiting Centre Rept 28) Jun 1939. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Subject document contains provisions covering technical requirements, as follows: Specification of articles to be supplied; materials; manufacture; acceptance which includes testing of external properties, testing of materials, testing of dimensions and weight, efficiency test and other tests; and packing. Sample of contents label is shown. As part of the efficiency test, 20 s. d. fuzes from every lot were tested in a filament combustion apparatus for functioning in connection with the tracer composition. Tests had to be carried out by means of officially recognized testing apparatus available at the suppliers' works, or in the neighborhood (at suppliers' expense), or in the Government Chemico-Technical Institute. Materials included Dur EgW 12240 (translator's note-probably some form of Duraluminium).

PB 25159. MARKS, F., tr. 2 Cm. S. D. round for M.G. 151 (1941), edited by Ansell. (BIOS Halstead Exploiting Centre Rept 27) Jul 1941. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

This document, translated from the German consists of the preliminary technical specifications for 2 cm M-projectile cartridges 151, 2 cm armored shell cartridges 151, 2 cm high explosive incendiary shell cartridges L'spur (tracer), 151 2 cm high explosive shell cartridges L'spur (tracer) 151, 2 cm high explosive cartridges L'spur (tracer) Ub 151, and 2 cm high explosive shell cartridges UB 151. Specifications include sections covering technical requirements; materials; manufacture; packing; acceptance following various tests including tests of external quality, weight and dimensions, firing, pressure, velocity, working mechanism, proof of tracer; and stamping.

PB 25160. MARKS, tr. Wind tunnel measurements of the model of a 7.5 cm. shell H.L. 43. (BIOS Halstead Exploiting Centre Rept 26) Oct 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
On the instructions of the DVM - Research Institute, three component measurements were carried out on the model of a 7.5 cm shell HL 43 with supersonic speeds (free jet 110 x 130 mm) and with sub-sonic speeds (free jet 215 mm), the coefficient of stability being calculated for an end angle of rifling of 7° and 8°. In the limits of speed investigated, between M = 0.5 and 1.45, the center of pressure showed only a very slight dependence on the Mach figure, while the coefficients for the standard power are greater with supersonic speeds than with sub-sonic. According to this, it is necessary to have a bigger end angle of rifling to stabilize the shell with supersonic muzzle velocities than with sub-sonic muzzle velocities. The results of measurements and calculation of coefficient of stability are presented in text and in diagrams. This report from the Institute for Questions Concerning High Speeds is translated from the German. Drawing of the 7.5 cm shell HL 43 and graphs are included.

PB 23811. HOSMAN, H. W. and others. Berlin-Lübecker Machinen Fabrik, Lübeck. (BIOS Final Rept 315, Item 2). Dec 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The above firm in Lübeck, Germany, was visited December 8, 1945, by representatives from the British Ministry of Aircraft Production, gun manufacturers, and an aircraft firm's armament section. The party was shown two types of barrel cold-forging machines, only the earlier type of which had been used in barrel production. In the earlier type of machine two eccentrics each operated two of the swaging tools through a wedging mechanism. The operation of these machines is described. The firm's experimental work on the cold forging of taper bore barrel is described and the theory explained in this report. Their new method of attaching rifle barrels to the receivers by swaging is also briefly described. It was concluded that the results obtained by this firm in the production of rifled barrels by the cold forging method was sufficiently satisfactory to warrant close consideration by British small arms manufacturers.

PB 25165. REIGNAULD, M. P. Short report on the usual formulae for exact armour penetration. (BIOS Halstead Exploiting Centre Rept 34) n. d. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The problem discussed in this article translated by Garrat is as follows: The dimensions, mass and quality of the shot are known, also the thickness and quality of the plate. What is the exact perforation velocity of the shot? On the assumption that penetration follows from a transformation of the kinetic energy of the shot a formula of the form $\frac{1}{2}mv^2 = f(xyzt\text{---})$, where x, y, z, t --- are all the characteristic quantities corresponding to the conditions of motion, is obtained. Very often these quantities can be reduced to "a" - the shot calibre and "e" the plate thickness. The function f is a single term, and the formula with two terms is no longer necessary. The author shows that it is by no means certain that so many factors can be neglected and discusses the possible need to use a double term formula. He discusses the most frequently used single term formulae--the Krupp, de Marre, and Moisson--and concludes that they have been of great service and can continue to be useful, but he states that important characteristics, such as length, hardness, and elastic modulus of the projectile, and rupture strength of the plate must be introduced into the formulae.

PB 25145. REKWORTHY, D. R., ed. The use of organic materials (with special reference to H. E.) in the construction of blast bombs. (BIOS Halstead Exploiting Centre Rept 50) Mar 1944. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a translation of a German document (March 1944) concerning the use of high explosive bombs as a structural material for the casing and components of explosive charges. Among the conclusions are the following: Such use is most appropriate for release weapons such as mines; wood and such synthetics as Dynal and Fronal may be used. As appendices there are diagrams of bombs with parts lists.

PB 25144. RUEHLE, DIETRICH. The penetration of bombs and shot in solid targets. (BIOS Halstead Exploiting Centre Rept 51) Dec 1943. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a translation from the German of an article by Dietrich Ruehle, of the Graf Zeppelin Research Institute, Stuttgart. The author reviews the studies of penetration and the methods of calculation used, beginning with the investigations of Poncelet more than one hundred years ago. He found that the results of these various methods of calculation could not be compared with one another because the materials and properties of the targets were not defined and because the physical values characterizing resistance are still not fixed. In order to present a general view of the most useful theories and experimental data available, the most important results are compared in a collective diagram which is explained in the text. Plotted curves are also included showing depth of penetration in relation to velocity at impact according to the formulae of Poncelet, Euler, Resal, Petry, and Giorgi.

PB 25157. SCHWEICKERT. Calculation of range tables for H.E. shells 15 mm. from M.G. 151 and Brunn gun for atmospheric pressure of 1245 kg/m³. (BIOS Halstead Exploiting Centre Rept 29) Mar 1942. 11 p.
Price: Microfilm-50¢ - Photostat-$1.00
The range table for 15 mm. is based on a microphone reading April 10, 1940. Microphones were set up every 50 m. to a distance of 900 m. Times of flight recorded and the velocity curve plotted therefrom are shown on graph in this report. The recording of the trajectories makes it possible to read off the range of each. By transferring the range table values obtained from the graduated scale to these ranges, curves are produced from which the desired values can be read as horizontal ranges, shown in one of tables accompanying report. The range table for the 15 mm. high explosive shells from the Brunn gun was derived in exactly the same way as the one calculated for the 15 mm. high explosive from the machine gun 151. Here again, microphones were set up every 50 m. to a distance of 1000 m. The time and velocity curve plotted from the reading is shown graphically together with the time and velocity curves for the Brunn ammunition. Tables for the coefficients of air resistance and the range table derived according to the same procedure.

PB 20403. TANNER, CARL. Artilleriegeschoss. (Original version of PB 20399). (Artillery projectile). German patent application T 58844. Mar 1943. 10 p.
Price: Microfilm-50¢ - Photostat-$1.00
This invention reduces the dispersion of guns by means of a steering apparatus installed in the nose of a projectile and governing the latter by increasing or decreasing the air resistance. In German. Not illustrated.

PB 9177. TELEFUNKEN, TÜXEN. Verfahren zur anzeigung eines vorganges bei annäherung eines körpers an ein ziel. (Method of indicating the approach of an object to a target). (German patent application, Sept. 21, 1944; patent pending). (Official No. T 60,964 Rept No. 8712) 1944. 4 p.
Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 23386. U. S. STRATEGIC BOMBING SURVEY. The plants of Dynamit AG-(Troisdorf, Clausthal, Krummel and Duneberg) (Rept 122; Propellants Plant Rept 3) Nov 1945. 272 p. Price: Microfilm-$3.00 - Photostat-$19.00
This report covers four explosives plants which belong to Dynamit AG or its subsidiary GmbH zur Verwertung Chemischer Erzeugnisse. Dynamit AG was without doubt a controlling influence in German explosives and propellant industries and their ramifications. Before the war the principal plant of Dynamit AG was in Troisdorf, which, in addition to nitrocelluloss, detonators and fuses, also manufactured a variety of plastics and lacquers. Although other plants increased in size the headquarters and research center remained at this place. The plant was the largest producer of industrial detonators and fuses in Europe but its role in war industry was of minor importance because the German government looked upon the plant as doomed because of its nearness to the border. Two attacks were made on the plant in December 1944. There were 364 bomb hits, representing 100 tons of bombs. The rolling mill plant was completely destroyed, the sodium azide plant was 70 per cent destroyed, five machines in the electric fuse plant were partly destroyed, plant laboratory was destroyed, some buildings were completely destroyed, and others were partially destroyed. This plant was entirely open to attack. The Clausthal Plant of GmbH zur Verwertung Chemischer Erzeugnisse, located in Forst Clausthal, Kreis Goslar, province of Hanover, was quite well protected by heavy blast walls or completely covered by earth, forming mounds. Many of the buildings were of skeleton construction, with the very light "Bimsstein" filling, forming walls about eight feet thick between reinforced concrete columns. The purpose of these light walls was to prevent serious damage to the equipment from falling debris in case of accidental explosion. Roofs were of reinforced concrete, covered with earth and overgrown with vegetation. Only one raid attacked this plant. Seventy of the buildings were damaged. The target was unable to operate for a period of six months. At the end of that period its potential capacity was restored to about 40 percent but shortage of raw materials and lack of transportation in Germany had become so acute that it was impossible to start operations. It was estimated that the plant could be restored to full production in two months. The Krummel plant located on the northeast bank of the Elbe River was highly vulnerable to air attack. There was no air opposition or anti-aircraft, and smoke defense was nonexistent. Camouflage was ineffective, although certain portions of the plant were apparently well hidden by foliage in the summer. The only attack against this plant occurred in April 1945. Physical damage to the entire plant was as follows: Power station 20% damaged; nitropenta press buildings 20% damaged; nitro-cellulose plant heide 5% damaged; K-salt plant completely damaged; abhang nitro-cellulose plant 20% damaged; TNT press building 20% damaged; living quarters 20% damaged. The Duneberg plant was located on the north bank of the River Elbe near Geestacht in heavily wooded terrain offering natural camouflage. The principal products of the plant were propellant powders of various compositions. The only raid made on this plant was in April 1945. It was estimated by plant officials that it would have taken them three to four weeks to repair some of the damage and restore production to 20 percent capacity. The plant was not repaired however, because the management realized that the end of the war was in sight. There are aerial photographs and other photographs of the various plants, bomb plots, labor tables, production tables, flow charts, graphs and processing operation as illustrative material. Processing methods in use for the following products are given: Nitro-cellulose, TNT; Hexogene.

PB 25155. VOSS. New developments in armament of fighter aircraft. (BIOS Halstead Exploiting Centre Rept 20) n. d. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This extract from a lecture by Flieger-Oberstabsingenieur Voss notes that the speeds of aircraft have increased while muzzle velocities in aircraft armament have remained substantially the same. Muzzle velocities were once 10 to 15 times the airplane's speed, but are now only 3 to 4 times as great and with higher speed planes they will be even less. This reduces accuracy of fire and duration of target engagement, even though the firing lead has been increased. Attack from the rear by a fighter is judged inferior to attack from the front though the time of combat to score the necessary number of hits is shortened. Therefore, he recommends increases in the intensity of fire or rockets of heavy caliber for long range firing. He gives calculations for angle of flight and deviations for angle of mounting, and recommends new methods of aiming, and close combat weapons discharged automatically vertically up or down when passing under or over an enemy plane, or "Krebs" firing of rockets afterwards by automatic discharge. A graph on area of combat and curves of constant speed allowance is included.

PB 25294. WEISSENBORN, K. Weissenborn's questionnaire. (BIOS Halstead Exploiting Centre Rept 5471). Dec 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This report consists of questions on various phases of the production of weapons in Germany, such as rifling, chamber design, and gun construction with answers as given by Herr Weissenborn. Several sketches are appended.

PB 25164. WINTER and WEIDLE. Pyrotechnic S.D. device for R 4 M. (BIOS Halstead Exploiting Centre Rept 38) Mar 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of a document from the Deutschen Waffen und Munitionsfabriken, A.G., German weapon and ammunition factory on pyrotechnic self destructive devices. The disintegration of rocket heads may be started by two different methods. There may be an installation in the fuse mechanism, or the disintegration may be initiated by the burning of the propellent charge. If after the ignition the rocket by chance does not launch normally the burning of the delay train cannot be stopped. In case of irregularities during the process of burning in the explosive charge, however, a simple safety device has been installed in the disintegrator. The explosion time can be varied up to nine seconds when using the recommended charge. For its functions the temperature is nearly insignificant, the delay at -40°C. being about 0.4 seconds compared to normal temperature and +50°C. The material of the delay holder had no effect on the burning of the pyrotechnic charge. Eight illustrations of the delay holder are attached.

Japanese

PB 22528. GRENELL, L. H. and CADY, J. H. Examination of enemy material (OD-113) (AC-77): A metallurgical examination of Japanese 75 mm. armor-piercing, high-explosive Howitzer rounds. Progress report 93, Jul 24, 1944. (OSRD Rept 4089; War Metallurgy Committee Rept M-359) Aug 1944. 26 p. Price: Microfilm-50; - Photostat-$2.00
The projectile from this ammunition has excellent metallurgical properties and should show satisfactory ballistic properties, in view of the low velocity attained from the small powder charge. No significant differences were noted between rounds manufactured in 1941 and those made in 1942. All steel parts were unalloyed and were apparently made by the basic open-hearth process with the use of considerable scrap in the charge. The projectile body had been differentially hardened by uniform heating, followed by spray quenching of the nose and give with water or brine. The fuze body, detonater, and tracer seal were made of medium-carbon unalloyed steel. The cartridge case was made from brass of the customary 70-30 Cu-Zn alloy. The appendix consists of photographs, drawings and graphs. Table 1 gives part data of Japanese 75 mm. A.P.-H.E. rounds, and table 2 chemical and spectrographic analyses of this ammunition.

PB 20390. GHURS, ROBERT W. Japanese 81 mm. recoilless gun. (AFPAC Ordnance Sect Rept 132) Dec 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The Japanese 81 mm. recoilless gun is of two models with differences in the tripod mounts and the venturi tubes. There is no recoil mechanism as the bored breech block allows a part of the propellent gases to escape to the rear. Two photographs illustrate the description.

PB 20387. HIRSHEIN, B. J. LEON and others. Japanese Army ordnance proving grounds. (AFPAC Ordnance Tech Intelligence Rept 8). Jan 1946. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
Although the Japanese had ample testing facilities, they were not utilized to the fullest extent during the war because of transportation difficulties, decreased production and a gradual lowering of testing requirements. At the close of the war only powder, fuses, and some materiel were given production acceptance tests. No research was carried on, the grounds being merely firing stations. A map shows the locations of proving grounds on Honshu Island, plans show the layout of Iraka Proving Ground, Totomi Proving Ground, and Otsugawa Proving Ground, and photographs and tables are included.

PB 20388. NELSON, ROBERT S. Japanese rifle, type 99, modifications. (AFPAC Ordnance Sect Rept 106) Dec 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Photographs illustrate the description of the Japanese long rifle type 99; type 99, modification; and type 99, modification 2. Type 99, long rifle, was built to give more accurate fire at longer ranges than the standard. It has a barrel length of 32½ inches. Type 99, modification 1, is an unfinished standard rifle, and modification 2 has a stationary rear sight.

PB 20389. WARDEN, K. L., JR. Type 4 7cm. Hollow charge rocket. (AFPAC Ordnance Sect Rept 136) Jan 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This Japanese projectile is one of three types of spin stabilized rockets used in the experimental type 4 7cm. rocket launcher. The propellant is composed of seven sticks of single perforated cylindrical powder 0.8 in. in diameter. When the rocket is fired the gases flow out through six holes in the base about 30° from the normal. A photograph and a drawing are included.

Roumanian

PB 25166. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. External ballistics of flak (Roumania) (Halstead Exploiting Centre Rept 35). Sep 1940. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation from Comptes Rendues des Séances de l'Institute des Sciences de Roumaine, Tome III, 1939, Nr. 5. A theory of the ballistics of the anti-aircraft defense gun is presented which includes the characteristics of the trajectories, the differential equations of the trajectory, the hodograph equation; construction of the trajectory, data on the trajectory cluster.

United States

PB 22082. ADAMS, J. R. Survey of test data on bomb, incendiary, 4 lb., AN-M54. (CWS Tech Div Memo Rept 617). Apr 1943. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the work was to review all the available test data on incendiary bomb, AN-M54. It is concluded that: bomb AN-M54 has been demonstrated an effective incendiary; it can be substituted for bomb AN-M50A1 without revision of tactical theory; it has a wide field of usefulness on any kind of incendiary bombing mission. A bibliography is attached to the report.

PB 23304. ADAMS, J. R. and others. Test of incendiary bomb M69 fired statically in predetermined locations in Japanese-type structures. (Dugway Proving Ground Special Rept 18). Jan 1944. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00
The object of the tests described in this report was to determine the relationship between the fire raising ability of the M69 bomb in typical Japanese residence structures and the expected defensive measures of the Japanese. Structures simulating Japanese houses were built at the Dugway Proving Grounds in Utah. Bombs were set off statically in these structures, and attempts were made to control them, using buckets of sand and water and stirrup pumps, the fires being fought by experienced and by inexperienced personnel. Records were kept of the number of bombs set off in each house, the extent of the fire, time necessary to get it under control, method of control, extent of damage, and other data. The results are given in tabular form. It was found that fires started by the AN-M69 bomb in typical Japanese structures are susceptible to attack in the early stages by means available to the householder. The effectiveness of such attack depending on the method utilized, the experience of the fighters, the accessibility of the fire and above all else the time elapsing before the attack is made. It was estimated that single hits from AN-M69 bombs, released over an area with 50% roof coverage of typical Japanese structures, would result in 114 appliance fires per 1000 bombs dropped. Photographs showing fire damage and a list of references are included.

PB 24864. AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Report of Special Research Committee on finishing and machining of H. E., steel shells, 75 mm., to 240 mm., inclusive. Apr 1946. 217 p. Price: Microfilm-$2.50 - Photostat-$15.00
In November 1944 the American Society of Mechanical Engineers was awarded a contract by the U. S. Army Ordnance Department which provided for a comprehensive study of the finishing and machining of high-explosive steel shells, and for a detailed report on this study. A preliminary report was submitted on July 1, 1945. The final, more detailed report is presented here. Machining plants visited are listed. In order to obtain as much information as possible, a rather complete questionnaire was drawn up on V-J day, and was immediately mailed to those machiners who had not been visited. This study was undertaken in an endeavor to find out how to make shells which meet Army specifications (1) quickly, with existing machines, and yet with a small number of man-hours, (2) with special, single-purpose machines. The forging of shells is not included in this study because the American Society of Mechanical Engineers had submitted two reports on that subject, on December 31, 1943, and on December 1, 1945. Various operations in the machining of shells are discussed under the following headings: Shaping by the removal of chips (machining); Nosing; heat treatment; shot blasting; banding; methods of weight control; washing and degreasing; and fastening the base plate. Tables, graphs, photographs, drawings, diagrams, and floor plans of shell producing works are included.

PB 21116. CARSWELL, T. S. and others. Development of a plastic incendiary bomb: Final report, June. 30, 1942. (OSRD Rept 6621) Feb 1946. 68 p. Price: Microfilm-$1.00 - Photostat-$5.00
The report describes the attempts to develop a two pound plastic incendiary bomb in which cellulose nitrate plastic was used as a substitute for the steel casing or was used both for the casing and as the primary incendiary material. The plastic bombs that were developed could not stand inspect when they fell on a hard surface at high velocity. In addition, the fire starting capacity was poor because of the relatively low heat of combustion of cellulose nitrate. Photographs, drawings and test data are given. This work was done under contract with the Monsanto Chemical Company.

PB 23236. CASH, J. S. Interference of service gas mask facepieces with shoulder weapons. (CWS Tech Div Memo Rept 433) Aug 1942. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the tests described in this report was to determine the relative interference with the firing of rifles by the service facepiece M2A2 and two service facepieces modified by the removal of all projections in the cheek area and by the rearward extension of the cheek pads. It was found that: (1) All the facepieces tested provided gastight comfortable seals on the wearer's face and did not interfere

aterially with the accuracy of rifle firing; (2) interference by the stock of the Gerand rifle with the cheek portion of the service facepiece when worn by a full faced rifleman could be eliminated by modifying the manner in which the rifle had been customarily sighted by him; all faceblank interference with rifle stocks was eliminated by the removal of the facepiece cheek yokes and rifle skids and by 1 inch rearward extension of the cheek pads; and no interference with shoulder weapons was caused by the hose tube, nosecup or carrier. Photographs and tabulated data are included.

PB 25356. CONKLING, L. J. Coating grenade bodies for titanium tetrachloride (F.M.) filling. (Edgewood Arsenal Chemical Div Rept 437) Dec 1928. 22 p. Price: Microfilm-$1.00 - Photostat-$2.00
This report describes tests upon the KJ grenade body which would make it an acceptable container for F.M. Coatings of the interior and exterior of the container were applied in order to check the leakage of F.M. Various paints, lacquers, and enamels were tested and the results are given in detail. Because of the difficulty encountered in obtaining a satisfactory coating on the grenades and because the Chemical Warfare Board recommended that the Universal HC (hexachloroethane) smoke candles be substituted for smoke hand grenades, the work on this project was discontinued

PB 25815. CONKLING, L. J. The development of a new filling for the 4-inch Stokes mortar shell, C.N. burning type. (Edgewood Arsenal Chemical Div Rept 389) Aug 1926. 44 p. Price: Microfilm-$1.00 - Photostat-$2.00
A new filling was developed consisting of 792 grams chloroacetophenone (CN), 1464 grams .30 caliber smokeless powder, and 80 grams magnesium oxide. The shell is designed to produce a highly lachrymatory cloud for training troops. For that reason, it is made as nearly harmless as possible. A single shell may produce lachrymation for one-half mile and irritation may at times be felt at distances as great as one mile. Tables of test data, diagrams of apparatus and shell and specifications for the production of the filling are included in the report.

PB 25804. CONKLING, L. J. The development of a non-flammable smoke grenade with F.M. filling for training purposes. (Edgewood Arsenal Chemical Div Rept 365) Mar 1926. 18 p. Price: Microfilm-$1.00 - Photostat-$2.00
A smoke grenade containing 142.8 cc. titanium tetrachloride was developed. Experimental work consisted in the careful calibration of the capacities of fifty grenades and the displacement of fifty detonator thimbles. In addition firing tests with different detonators were conducted. This grenade produces a dense white smoke of good obscuring power, does not constitute a fire hazard and as a training grenade is preferable to the WP (white phosphorus) grenade. However, it is not as effective in producing casualties as the WP grenade. Diagram of smoke grenade is included.

PB 25365. CONKLING, L. J. Grenade for simulating shell burst and fast-burning H. C. grenade. (Edgewood Arsenal Chemical Div Rept 521) Sep 1930. 12 p. Price: Microfilm-$1.00 - Photostat-$1.00
The purpose of the tests was to develop a fast burning grenade for use at the 1928 Military Exposition and Carnival at Washington, D. C. A grenade was developed which would satisfactorily simulate the burst of a 75-mm. shell, the functioning of which was not dangerous to personnel at a distance of 10 feet. By employing a special H. C. (hexachloroethane) smoke mixture, the grenade can be made to burn for 3-4 seconds and produce a large volume of smoke. Photograph is included.

PB 25789. CONKLING, L. J. Investigation of black smoke mixtures. (Edgewood Arsenal Chemical Div Rept 329) Dec 1924. 11 p. Price: Microfilm - $1.00 - Photostat - $1.00
A few experiments have been run to determine the value of a black smoke mixture recommended in an Italian report. The black smoke producing materials consist of mixtures of carbon tetrachloride and either benzene or light tar oils absorbed in a combustible mixture of potassium nitrate, sulphur, and sawdust. The smoke produced from candles containing this mixture was very much inferior to that produced by the British type smoke torch Mark I. The substitution of fuel oil for benzene did not make any noticeable improvement. A few additional experiments were performed with solid smoke producing materials, the mixture consisting of hexachloroethane and either anthracene or naphthalene mixed into the same combustible material as previously used. The candles made from these materials gave much better smoke than those recommended in the Italian report and, in fact, were better than the British smoke torch Mark I, but inferior to the standard hexachloroethane smoke.

PB 25791. CONKLING, L. J. Investigation of red phosphorus candle. (Edgewood Arsenal Chemical Div Rept 332) Feb 1925. 27 p. Price: Microfilm - $1.00 - Photostat - $2.00
Loose and compressed mixtures of red phosphorus with various oxidising agents were loaded into hexachloroethane smoke candle container, Mark I, and fired. The most satisfactory mixtures consisted of 20-22.5% sodium nitrate and 80-77.5% red phosphorus. These mixtures were very sensitive to impact and various materials were added to desensitize them. An addition of 20% of glycerine was found satisfactory. Photograph of impact machine is attached.

PB 25788. CONKLING, L. J. Preliminary development of a 3-inch Stokes mortar shell, burning type, with lachrymatory filling. (Edgewood Arsenal Chemical Div Rept 326) Dec 1924. 17 p. Price: Microfilm - $1.00 - Photostat - $2.00
The regular 3-inch Stokes mortar shell has been modified by drilling twelve holes three-eighth inch in diameter around the shell near the top. These holes are covered with a strip of zinc, .010 inches in thickness. The filling consists of a mixture of 540 g. of .30 caliber smokeless powder, 210 g. of chloroacetophenone, and 10 g. of magnesium oxide. This mixture is loaded into the shell in a plastic condition and tamped down thoroughly, after which a little chloroacetophenone is poured around the crack which develops. The Mark VI fuse with a reduced powder charge is used for igniting a starter consisting of 28% iron sulphide, 26% hammer scale, and 46% meal powder, bound to the surface of the filling. The shell gives off a heavy lachrymatory cloud for about nine minutes when freshly made up, and for a shorter time after standing some time. Appended is a diagram of the shell.

PB 23159. DENUES, A.R.T. Engineering test of WP-filled 4.2-inch chemical mortar shell M2, lot no. 3296-1, H. K. Porter Co. (CWS Tech Div Memo Rept 417) Jul 1942. 22p. Price:Microfilm-50¢ - Photostat-$2.00
As a result of the investigation reported it was concluded that the presence of excessive amounts of water in WP-filled 4.2-in. chemical mortar shell M2 can lead to a high incidence of tumbling. The data also suggest that partly molten eccentric fillings cause tumbling and that the total weight of the shell, in the range 21-lbs. 8 oz. to 27-lbs. 2 oz., and the deposition of the filling are of relating limited interest in the occurrence of tumbling. Tables appear in the report; a sketch is attached showing method of tapping shell for water; and the appendix gives details of tapping and plugging of noses of WP(white phosphorus) shell.

PB 23163. DENUES, A. R. T. Static tests of containers for 4.5-inch chemical rockets. (CWS Tech Div Memo Rept 447) Sep 1942. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

This report records the results of tests to determine dispersion patterns and the suitability of the burster and general design of the subject container for dispersion of an agent. Static tests were made with 4.5-in. containers equipped with both 14-in. and 9 5/8-in. tetryl bursters, and with 4.2-in. mortar shells fired with 14-in. tetryl bursters. The results of all the tests are roughly equivalent and compare favorably with previous tests with the standard one-gallon land mine when allowance is made for the relative weight of agent used in the various cases and for the virtual absence of wind in the present tests.

PB 23147. DYER, HARRY E. Large field collective protector M10R2, further development to correct defects of large field collective protector M1, M10R1. (CWS Tech Div Memo Rept 362). Jul 1942. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The final model resulting from this work was large field collective protector M10R2, described in this report. The object: to supply enclosed spaces with purified air. The photographs mentioned as attached to appendix A are missing from this copy.

PB 23157. ELTON, ROBERT W. Gunfire tests of self-sealing tanks. (CWS Tech Div Memo Rept 406). Jun 1942. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the tests was to determine the effectiveness of three exterior self sealing materials, for tanks filled with liquid mustard and pierced by .50 caliber armor piercing ammunition. The sealants were (1) reclaimed rubber (EP-1-T-1), (2) long nap cocoanut matting with a compression rubber mat over it (EP-1-T-2), and (3) reclaimed rubber compound (EP-1-T-3). Results of the tests showed that these materials were not effective for the purpose and also that the weights of the sealants were excessive. It was recommended that lighter and more effective sealants be developed.

PB 23145. ELTON, ROBERT W. Smoke apparatus M1 for mechanized vehicles. (CWS Tech Div Memo Rept 350). Aug 1941. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This report records the results and conclusions of the engineering tests of the smoke apparatus M1 for mechanized vehicles manufactured by the Kincaid Company. Tables appear in the report, photographs and diagram are attached.

PB 23142. ELTON, ROBERT W. Smoke apparatus for mechanized vehicles. (CWS Tech Div Memo Rept 343) Jul 1941. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
Smoke may be produced by the injection of oil into the exhaust manifold or exhaust line of a mechanized vehicle. The simplest and most advantageous method is the use of gravity flow or exhaust pressure. It appears that either of these methods will provide a smoke cloud of good volume and satisfactory duration, with the least amount of drippage. Table and diagrams are attached.

PB 22172. GERLITZ, D. W. Chemical filling for airplane bombs. (CWS Tech Div Memo Rept 455) Oct 1942. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
Certain mustard gas filled M47A1 bombs in storage at Edgewood Arsenal leaked or burst. As a result of an investigation it was determined: (1) That the bombs were overfilled, leaving less than the required 10% void; (2) a chemical reaction took place which created an excess of hydrogen, quite probably by the introduction of water; (3) the bombs were poorly fabricated; (4) the bombs were suitable for filling with IM (isobutyl methacrylate); (5) the bombs were not suitable for filling with mustard gas; (6) asphalt paint, red or white lead and linseed oil, and the zinc or cadmium plated on the burster well have no detrimental reaction with mustard gas. Photographs and a diagram of the bombs are included in the report.

PB 23162. GILBERT, J. E. Fillings for magnesium incendiary bombs, AN-M52. (CWS Tech Div Memo Rept 437) Sep 1942. 18 p. Price: Microfilm-50¢ - Photostat-$1.00
This report concerns the development of filling constituents for the AN-M52 which would give satisfactory burning characteristics and functioning upon impact. The results of the tests conducted are summarized in tables.

PB 22267. GODDARD, RUPERT. Chemical filling for artillery shell: Test for leaks through silver-brazed joints in 81-mm. mortar shell M57, empty and filled, when closed with burster casing M2. (CWS Tech Div Memo Rept 285) May 1941. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
The report describes the tests on shells, which, when filled, contain phosgene, FS mixture (SO_3 and chlorosulfonic acid), Levenstein mustard, or white phosphorus. Tables show the dimensions of the shell parts used in the tests and the result of the tests for leaks. Some of the shells developed leaks, which were attributed to faulty workmanship. It was recommended that varnish not be used on the male parts of the shells. It was also concluded that the use of the silver alloy provided a satisfactory method for the bonding of the adapter of the shell body and the sleeve to the burster casing.

PB 22844. GRIFFIN, D. R. and others. Acoustic design of earphone sockets for helmets and headsets. (OSRD Rept 828) Aug 1942. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
A study of the design and development of earphone cups to aid in the improvement of communication in the intense noises encountered in combat aircraft was undertaken at the Psycho-Acoustic Laboratory at Harvard University, and is presented in this report. It was found that the standard U. S. Army and Navy helmets in service in 1942 provided very inadequate attenuation of outside noise, much less than the type B British and the German helmet. A new design of earphone socket for installation in helmets, known as Design 5, made by the Tyer Rubber Company, of Andover, Massachusetts, was developed which proved to be satisfactory. The development of this model is described. The importance of protection against noise, the technique of attenuation measurements, the design of British, German, U. S. Army Air Force and Navy helmets, and factors in helmet design making for good attenuation of outside noises are discussed. Drawings, attenuation curves, and photographs are included.

PB 23302. GUTHMANN, W. S. and LEWIS, R. H. Small incendiary bomb, oil type (5-10 lb.). (Dugway Proving Ground Special Rept 3). Apr 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the tests described in this report was to obtain information concerning the characteristics of small oil-type incendiary bombs. The clusters described were dropped one at a time from an airplane at various heights. The bombs were spotted after each dropping on the salt flat used as a target, and the information recorded. An accompanying table shows the results of ten drop tests of a six-pound incendiary bomb AN-M69. It was found that the dispersion of the bombs was satisfactory, but the aimability and functioning were poor, and a number of recommendations were made for improvement. Also included is a memorandum report on the examination of commercially produced M69 bombs and charts showing dispersion of these bombs when dopped from altitudes of 3000 and 10,000 feet.

PB 19475. HANSON, A. C. Partial report on tests of floating piston packing rings: Construction and operation of the hydraulic gymnasticator. (Rock Island Arsenal Lab Rept 39-2518). Sep 1939. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
At a meeting of the Ordnance Advisory Committee on Rubber, March 17, 1938, the question of testing floating rubber piston rings used in recoil mechanisms without the necessity of firing the mechanism was brought up. It was recommended that Rock Island Arsenal should design and build such an apparatus. After considering all possible methods of laboratory testing, it was believed that the best method was to use a hydraulic

investigator with a standard 75 mm. recoil mechanism. A description of this apparatus and its operation is given in this report. Tests showed that the packing rings in the floating pistons of recoil mechanisms may be satisfactorily tested by this equipment without conducting actual firing tests. A photograph is included.

PB 22165. HAYES, J. H. Interpolymer gasoline gel fillings for the M47, 100-lb. incendiary bomb. (CWS Tech Div Memo Rept 493). Dec 1942. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Tests were conducted to determine the functioning characteristics of 5% and 4% du Pont IP (interpolymer) gels in the M47 incendiary bomb, and to compare them with the IM (isobutyl methacrylate: simple polymer) type I gel. Both the 4% and 5% IP gels were found satisfactory as incendiaries when judged from bursting and ignition characteristics. Neither of these appeared to be as strong as the IM gel. The dispersion of the 4% and 5% IP gels was satisfactory at 68°F. and 77°F. At lower temperatures the dispersion area was smaller. Tables show results of tests. Two graphs show burning tests of the 4% and 5% IP gels.

PB 23782. HAYWARD, FRANK W. Approach noise tests on M-3 light tank #6306 (Serial No. 909) (OSRD Rept 609) May 1942. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
The quieting program on this light tank was mainly carried out by measuring noise at some specific point on the tank, depending on the particular test. Important noise changes were accomplished at the sprockets and at the exhaust outlet, for example. In order to determine objectively the effect of these changes on the audibility distance of the tank, measurements were made with the noise testing equipment set up at a stationary point with the tank approaching at various speeds from a considerable distance. The results of these tests, as well as the test procedures, are discussed in this report, prepared in the Accustical Department of the General Motors Corporation. Test data are given in tabulated and plotted form. See also PB 23781 and PB 23784.

PB 23781. HAYWARD, FRANK W. Sprocket noise investigation of M-3 light tank #6306 (Serial #909) (OSRD Rept 608) May 1942. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
As part of the program for reducing the tactical noise of M-3 light tanks, a study of the noise generated at the sprockets was undertaken by the Proving Ground Section of General Motors Corporation, and means for the reduction of this noise was investigated. The method of measuring noise and the changes made to reduce noise are described. The sprocket clatter was reduced by a factor of 6 db overall, and between 10 and 25 db in the frequency range above 300 cycles per second. This was accomplished by the use of rubber rings which absorb the impact of the track blocks on the sprocket teeth. The use of rubber rings, however, while excellent from a noise reduction viewpoint, is not a production solution in the particular form tested, due to clearance problems. A more practical substitute for the rubber rings has been designed to give equivalent noise reduction without introducing interference problems. This alternative method involves a modification of the profile of the sprocket tooth shoulder, and the insertion of a bonded rubber vibration damper to absorb radial impact. A drawing illustrating this device is included as Plate 3. Other conclusions and recommendations, together with photographs and noise analyses curves accompany this report. See also PB 23782 and PB 23784.

PB 23783. HAYWARD, FRANK W. Track noise and vibration tests on M3 light tank #6306 (Serial #909). (OSRD Rept 610) May 1942. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
In order to reduce the noise in the M-3 light tank a series of track changes were studied, as well as modifications of the suspension and associated parts. Procedures in measurement of track rumble and vibration are described. It was found that the present production track is responsible for considerable hull vibration in the M-3 light tank. This vibration is most evident at speeds around six and thirteen mph, where the spring suspension seems to be approximately in resonance to the track excitation. Various tracks and bogie wheel suspensions were tested and results given in detail. Recommendations are given for decreasing vibration. The report includes graphs and photographs of the various tracks used. Tests reported were carried on at General Motors Proving Ground.

PB 23101. HOLMES, W. C. and OLENIACK, C. J. The German SD 400 Kugel K - "Kurt" apparatus. (U. S. Naval Tech Mission in Europe Tech Rept 458-45) Sep 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report contains information on the German spherical skip bomb, SD400 Kugel K -"Kurt" Apparatus. This missile was not used operationally in World War II. Illustrated with diagrams and photographs, some of which will not reproduce well.

PB 23785. HUBER, PAUL. Recommendations on quieting tanks. Mar 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This report forms a summary of recommendations made at a meeting March 14, 1942 held at General Motors Proving Grounds for the purpose of reducing in and outside noises of tanks. It was found that the outside noises could be reduced by installing an adequate muffler and reduce track noises. Further, inside noises could be reduced by isolating engine compartment from fighting compartment either by closing all the openings in the bulkhead or by installing an acoustically absorbent tunnel over those openings which were essential and by substituting a sound absorbing lining for the present lining of celotex.

PB 23780. HUBER, PAUL. Summary of noise investigation on M-3 light tank #909. (OSRD Rept 488) Apr 1943. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This report covers a test program undertaken for the purpose of reducing the noise of tanks. The M-3 light tank was supplied for the investigation and all the tests discussed in this report were performed on this vehicle. The directive provided that the problem be approached from the viewpoint that modifications of the present design would be sought rather than major re-design. The majority of the changes suggested were to be incorporated into the present light tank design without serious interference with production methods. The various tests are described in detail and the report contains results of tests in tabular and graph form, drawing, and photographs.

PB 4395. HUSSEY, F. W. Summary report on 105 mm., M14E1 steel cartridge case. (Frankford Arsenal Ordnance Lab Rept R-651) Sep 1945. 145 p. Price: Microfilm-$1.50 - Photostat-$10.00
The essential details of final production methods employed by manufacturers of 105 mm. M14E1 steel cartridge cases are summarized in tables, drawings, and charts. Supplementing the tables and figures are outlines of the procedures, as well as discussions of the problems involved and the results obtained. Two distinct variations from the conventional method of making brass cases were: (1) The practice of forming the cup in two operations, and (2) the pre-heating or coining of the cup or 2nd draw piece in order to avoid the formation of folds during heading. Tables, diagrams and graphs present test data, and photographs and a bibliography are included.

PB 18857. KINCAID, J. F. and DAILEY, B. P. Thermochemical examination of a number of commercial and experimental propellants: Progress report, to May 15, 1943. (OSRD Rept 1578) Jul 1943. 15 p. Price: Microfilm-50¢-Photostat-$1.00

This report presents data on the thermochemical properties of a number of presently used propellants and introduces a "rational heat" which, in a discussion of the comparative properties of propellants, is decidedly preferable to the more commonly used direct experimental term "heat of explosion". The results strikingly illustrate the necessity of analyzing the products of explosion if a valid comparison of the potential of different propellants is to be made. This is especially true of cool powders where heat effects, such as NH_3 and NH_4HCO_3 formation, are especially prominent. Since these products are not formed in the gun, their heat of formation must be subtracted from the observed heat of explosion. It is also found that the observed heat of explosion is strongly dependent on loading density in some cases. In these cases, heats of explosion are reproducible only under carefully controlled conditions. The calorimetric apparatus and procedure are described and the calculations are illustrated. This is a progress report under contract with Carnegie Institute of Technology.

PB 22046. KLINE, S. Q. Development of cluster adapter M1 for incendiary bombs M47A1-2. (CWS Tech Div Memo Rept 684). Jun 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The object was to develop an adapter, cluster, for four incendiary bombs, 100-lb., the cluster to be suitable for hanging from either single (center) or double lugs, in being suspended from the bomb racks of airplanes. Adapter M1 described in this report appears to meet all requirements for proper mechanical functioning. Diagrams and photograph appear in the appendix.

PB 25807. LAWRENCE, E. T. The development of the 4" Stokes mortar smoke shell with H. C. filling. (Edgewood Arsenal Chemical Div Rept 374) Mar 1926. 42 p. Price: Microfilm-$1.00 - Photostat-$3.00
It was desired to develop a Stokes mortar shell, for training purposes, which would evolve smoke over a period of minutes without endangering personnel in close proximity. A suitable HC (hexachloroethane) filling and a starter pellet were developed. The shell contains no burster charge but sufficient pressure develops to permit the smoke to escape through the holes. For war purposes, a WP (white phosphorus) filling is recommended. Tables of test data and diagrams of the mortar are included in the report.

PB 25795. LAWRENCE, E. T. Investigation of a copper plated H.C. smoke candle. (Edgewood Arsenal Chemical Div Rept 336) Mar 1925. 15 p. Price: Microfilm - $1.00 - Photostat - $1.00
The standard hexachloroethane candle mixture was compressed into a block 4-3/8 inches high, 3 inches long, and 2 inches wide, having a small hole in the top for insertion of a zinc or tin starter cup with firing mechanism. The block was then coated with melted paraffin, resin, or other similar materials, and finally copper plated in an acid copper sulfate bath. The chief difficulty was in getting a high percentage of perfect coatings and platings which are absolutely necessary to prevent the deterioration of the smoke mixture that occurs when it comes into contact with moisture. It is very doubtful whether the process would be feasible on a production scale. Burning of copper plated candles made from the standard mixture used in the hexachloroethane candles, Mark I, was unsatisfactory because this mixture requires a candle with a constricted orifice for best results. Attached is a diagram of the ignition device used.

PB 23306. LEWIS, EVAN H. and RICARDS, HAROLD A. Penetration of the AN-M69 bomb into Japanese structures when released from aimable clusters: Supplement. (Dugway Proving Ground Special Rept 39, Supp). Jan 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
In order to obtain additional data on the penetration of light Japanese targets by the AN-M69 bomb when released from aimable clusters, forty-three M46 clusters were released from an airplane from about 20,000 feet and set to open at 5,000 feet. Thirteen hits were obtained on the Japanese type dwelling structures which had been erected as targets at the Dugway Proving Grounds in Utah. The tests are described and the results discussed in this report. It was concluded that: (1) The penetration of this bomb released from aimable clusters which air-separate at a minimum altitude of 5,000 feet above the target is approximately the same as when released from quick-opening type clusters; (2) the penetration of the AN-M69 bomb is not excessive for use on light one-story Japanese construction; and (3) the present type of fusing involving a 3-5 second time delay is desirable. It was recommended that instantaneous fusing of this bomb not be employed. Nine hits were made on German type structures and data are included regarding the effects. Tabulated data, diagrams showing penetration into Japanese and German type structures and photographs of bomb damage are included.

PB 4409. LIBSCH, J. F. Shot peening to inhibit season-cracking of 70/30 cartridge brass. (Springfield Armory Eng Dept Tech Rept WO-664 Partial) Apr 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
Experiments were conducted to determine the effect of shot peening on residual stresses in metals. The surfaces of 70/30 brass stressed in tension from residual stress are subject to intergranular corrosion. It was found that shot peening is an effective method for inducing compressive stress to correct residual tension stress. Surfaces corrected for residual tension stress by shot peening inhibit stress-corrosion. Shot peening must be carefully controlled to provide a balance between residual tension stress and induced compressive stress. Redistribution of stress throughout the cross-section of the specimen must be carefully considered for satisfactory application. Shot peening markedly decreases the rate of stress-corrosion for 70/30 cartridge brass wherever practically applicable. Photographs and tables are included.

PB 23202. LITTLE, ARTHUR D., INC., CAMBRIDGE, MASSACHUSETTS. Use of substitute materials in the manufacture of cork plugs. (OSRD Rept 178) Nov 1941. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
After study of many materials followed by small size and full size laboratory production tests, the material selected as the most promising substitute for cork is wool shearings molded with a phenolic resin binder. A plug with cored out depressions or holes on the under side looks to be preferable to a solid piece. It is believed that a satisfactory plug can be made at a cost equal to or less than the cost of the present plug. The appendix contains a list and characteristics of sample plugs submitted to Dahlgren Proving Ground; copy of letter dated Oct. 27, 1941, to Lt. Comdr. W. S. Prim, Bureau of Ordnance, Navy Department, Washington, D. C.; and drawing of mold used for making sample plugs.

PB 22060. LOEW, THEODORE. FS spray apparatus. (CWS Tech Div Memo Rept 647). May 1943. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
A satisfactory FS (mixture of sulfur trioxide and chlorosulfonic acid) spraying device was developed, using the shipping container as the pressure vessel, and the reaction between formic acid and FS as the source of pressure. A glossary of terms, photographs, and diagrams are attached to the report.

PB 22168. MCBERTY, R. K. HC smoke, variations in fineness of secondary grained aluminum as affecting burning time of HC smoke grenade AN-M8. (CWS Tech Div Memo Rept 583). Feb 1943. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Experimental data is given from which it is concluded: 1. samples of secondary grained aluminum from different sources give different settling rates, indicating different particle size distributions; and 2. the burning time of HC (hexachloroethane) smoke grenade M-8 (type C) is a function of the settling rate of the secondary grained aluminum. Graph, diagram and tables are included.

PB 22273. MCCULLOUGH, GEORGE H. Development of chemical projector. (CWS Tech Div Memo Rept 297) Jun 1941 43 p. Price: Microfilm-50¢ - Photostat-$3.00
This report presents data, drawings and photographs of the chemical projector. The tests showed that this projector shell was too heavy for mass use, too expensive, and insufficient in wall strength, but it was reasonably accurate.

PB 23156. McCULLOUGH, G. H. Pressure-time data obtained after firing 4.2-in. chemical mortar with eight to twelve bundles of powder at Naval Proving Ground, Indian Head, Md. (CWS Tech Div Memo Rept 408). Jun 1942. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
It was noted that the increase in muzzle velocity is about twice as great between 10 and 12 bundle charges as it was between 8 and 10 bundles of powder. It was recommended that further work be done to definitely establish the location of the shell in the barrel when the maximum pressures are obtained with 8 to 12 bundles of powder. The muzzle velocity was determined by the use of a high speed camera and timing device. Tables and photographs of tests.

PB 22173. MACINTIRE, B. G. Base ejection smoke shell, WP-filled (preliminary tests Dec. 1, to Jun. 31, 1942) (CWS Tech Div Memo Rept 453) Oct. 1942. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
It was desired to develop a suitable method of dispersing white phosphorus (WP) from base ejection shells for screening purposes. Canisters were designed and manufactured for WP filling in 105 and 155 mm. base ejection shells. These shells were fired either statically or from a howitzer. Tables show the results of the tests. It was concluded that the shells fired statically produced good smoke screens; those fired from a howitzer did not screen satisfactorily. Drawings of shell and canisters are included.

PB 23148. MACINTIRE, BENJAMIN G. Test of smoke filled 155-mm. howitzer base ejection shell, T. (CWS Tech Div Memo Rept 367) Mar 1942. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
From results obtained the following conclusions are reached: (1) when filled with HC (hexachloroethane) smoke mixture and fired for burst over reasonably hard ground, a good screening smoke for a period of about 3 minutes is produced; (2) when filled with WP (white phosphorus) the volume of smoke was less than with HC but the average burning time was in excess of 10 minutes. Diagrams, tables, and photographs are attached.

PB 22048. MAGRAM, S. J. A survey of starters for burning-type munitions. (CWS Tech Div Memo Rept 655). May 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
The report is given on the study made of starters for both the thermit type bombs and smoke munitions. A glossary of terms is included.

PB 22170. MOLEN, J. T. Freezing tests of vesicants in the M-30 chemical spray tank. (CWS Tech Div Memo Rept 474) Nov 1942. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
As a result of these tests, it was recommended that if it is desired to use the M-30 tank without insulation on high altitude spray missions longer than 5 hours, HS (50-50 mixture of mustard gas and lewisite) or thickened HS should be carried in the tank as the most suitable vesicant from the standpoint of solidification. If either mustard gas, the mixture of mustard gas and chlorobenzene, lewisite or thickened lewisite are to be used in the tank for long high altitude flights, one inch of cattle hair felt and the initial temperatures specified in the report should be provided to prevent freezing. A standard method should be developed to heat the agent to its required initial temperature. Tables and graphs of test results are included.

PB 23122. OSBORNE, M.F.M. and TAYLOR, A. H. Report on relative pressure measurements in shock waves from small underwater explosions. (Naval Res Lab Rept S-2306) Jun 1944. 98 p. Price: Microfilm-$1.00 - Photostat-$7.00
This report presents the results of a study of the pressure waves from small underwater explosions, and of the dynamical properties of piezoelectric pressure gauges. Such a study is important for an understanding of the physical phenomena involved in the detonation of a mine or torpedo, as well as for the proper interpretation of piezoelectric gauge responses in explosion damage investigations. It is shown that there is a small departure from the $1/r$ law for pressure variation of the form $1/r\ (\log r/a_0)^{\frac{1}{2}}$, a_0 being the initial equivalent spherical radius of the charge, and $r \gg a_0$. The spreading of the shape, or profile, of the pressure wave with propagation is very small. The profile is approximated by an exponential to one quarter the peak pressure. The observations are in quantitative agreement on these points with the theory of Bethe and Kirkwood except that the spreading is much smaller than expected. An approximate theory of nonlinear propagation in water is developed, which gives the same results as the Bethe-Kirkwood theory. The different types of distortion in piezoelectric gauge responses are discussed in detail and exemplified. A gauge is described, the response of which is linear through the range of pressures measured, and reasonably constant throughout a frequency band of sufficient width for explosion wave measurements. A simple test of piezoelectric gauges which will detect the presence of nonlinearity and false signal, such as are generated in the cable and dielectric, is suggested. An approximate quantitative method for determining the diffraction of transients is worked out, and applied to the cases of a freely suspended disc and a flat rectangular bar. In view of the approximation of the theory, the agreement with experiment is good. Photographs, diagrams, oscillograms, and curves illustrate the report. Bibliography included.

PB 23144. POMMER, S. G. Bomb, chemical, 100 lb. M47; and bomb, incendiary, 4 lb. AN-M54. (CWS Tech Div Memo Rept 349). Jan 1942. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests of these bombs were inconclusive, and the relative incendiary value was not determined. It is recommended that the test be repeated. Table and photographs are attached.

PB 23146. POMMER, S. G. Bomb chemical, 100-lb. M47; bomb incendiary, 4-lb. AN-M54; and bomb incendiary, 4-lb. AN-M50A1. (CWS Tech Div Memo Rept 389). Mar 1942. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of this test was to determine the relative incendiary value of various types of incendiary bombs. The results are given in the report. Definite conclusions as to the relative incendiary value of the munitions tested could not be made from the results of this test because the operation conditions were arbitrarily selected, with no assurance that these conditions would be obtained in service. It is recommended that further test be made from airplanes flying at normal bombing altitude with these bombs dropped on suitable incendiary targets.

PB 23154. POMMER, S. G. and GILBERT, J. E. Test of incendiary munitions at Huntsville Arsenal. (CWS Tech Div Memo Rept 401) Jun 1942. 109 p. Price: Microfilm-$1.50 - Photostat-$8.00
The object of these tests was to determine: (1) The penetration by the munition into a structure, before functioning; (2) the number of each munition that functioned upon impact on the target; and (3) the relative incendiary efficiency of the various incendiary munitions. The results obtained are listed for static and drop tests. Conclusions and recommendations are given. Photographs and appendices are attached.

PB 22183. PRINCE, LEON H., JR. Explosive incendiary bomb AN-M54X-A1, short delay. (CWS Tech Div Memo Rept 587). Apr 1943. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00
The object of the work described was: (1) to provide a short-time delay explosive charge for the AN-M54 incendiary bomb; and (2) to determine whether the heat conductivity method of securing long-time delays of from 1 to 10 minutes as employed in the AN-M50X-A2 and AN-M52X bombs can be successfully ap-

plied to the AN-M54X bomb. It is believed that the short-time delay bomb AN-M54X-A1, type B, satisfies the requirements. The method of obtaining long-time delays by heat transfer, as employed in the AN-M50X-A2 and AN-M54X-A1, type B, satisfies the requirements. The method of obtaining long-time delays by heat transfer, as employed in the AN-M50X-A2 and AN-M52X bombs, is not applicable to the AN-M54X bomb. Supplementary experimental data, photographs, and engineering drawings are appended.

PB 22156. PRINCE, LEON M., JR. Variable delay explosive incendiary bomb AN-M50X-A2. (CWS Tech Div Memo Rept 585). Mar 1943. 88 p. Price: Microfilm-$1.00 - Photostat-$6.00
The AN-M50X-A2 consists of two types, a long delay bomb, type A, exploding 2 to 10 minutes after impact, and a short delay bomb, type B, exploding 60 to 70 seconds after impacts. The results of tests for both functioning and fragmentation are given. It is concluded that the two types of bombs cannot be distinguished from the regular incendiary bomb in action and that it contains a lethal explosive action. Diagrams, photographs, and engineering drawings are appended.

PB 22154. PRINCE, LEON M., JR. and WILLEE, L. G. Variable delay explosive incendiary bomb AN-M52X. (CWS Tech Div Memo Rept 586). Jun 1943. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
The AN-M52X consists of two types, a long delay and a short delay bomb. The long delay, type A, is designed to explode in 1 to 5 minutes after impact; the short delay, type B, in 35-60 seconds after impact. The results of tests for both functioning and fragmentation are given. The two types of bombs substantially satisfy the requirements. Diagrams, tables, photographs and engineering drawings are included.

PB 23153. SMITH, B. F. Engineering test of HE filled 4.2-in. chemical mortar shell. (CWS Tech Div Memo Rept 400) Jun 1942. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
Experimental data is given leading to the conclusions: The present 4.2-in. chemical mortar shell, M2, base or nose filled, and the modified M2, designated as the M3 shell, are satisfactory types of 4.2-in. HE (high explosive) shell from the standpoint of flight stability, functioning at impact, and demolition effect produced. Tables are included, assembly drawing of the shell and photographs are attached.

PB 4415. SPRING, SAMUEL and GISSEN, HENRY. Lubricants for drawing brass cartridge cases. Fourth report. (Frankford Arsenal Ordnance Lab Rept 632) Dec 1940. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
It has been demonstrated in the fourth draw of caliber .30 case pieces with the 20,000 lb. Tinius Olsen Testing Machine, that films of stearic acid cause a reduction of 9-17% and films of dry soap a reduction of 0-9% in the maximum draw load, when compared with a 2% soap-in-water lubricant. A combination of the stearic acid film and the soap lubricant is not as effective as the dry fatty acid film above. The direction of draw is of only minor importance. Evidence is presented to show that the film of oxide normally present on the surface of the case pieces aids in lubrication during drawing. When this film is removed, the pieces fracture when drawn with special tools. This fracture is prevented by coating the draw pieces with a film of oxide or stearic acid, the latter having the additional advantage of considerably lowering the draw load. When the oxide coating is sufficiently thick to impart a dark brown surface color to the pieces, the draw load is increased. Photographs, graphs and tables are included.

PB 24843. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Activator, M1. Apr 1945. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00
Method of loading, assembling and packing of the activator, M1, based on procedures used as of Feb 1945 at the Louisiana Ordnance Plant, is described. Photographs with notations are shown for all steps of the operations. Lists of parts and materials are included. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 24853. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Adapter-booster M115A1. Aug 1944. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
A step-by-step description of a method of loading, assembling, and packing the adapter-booster, M115A1, is given in this report. The information is based on methods used at the Nebraska Ordnance Plant as of June 1944. Photographs of equipment and operations illustrate the procedures. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are given.

PB 24855. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Auxiliary booster M104. May 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
A method of loading, assembling and packing this auxiliary booster is described. The procedures outlined are based on methods used at the Iowa Ordnance Plant as of April 1944. Photographs of equipment and operations accompany the detailed instructions. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are given.

PB 24856. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, G. P., 500 lb., AN-M64A1 (composition "B" loaded). Sep 1944. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
Each consecutive operation in the loading and assembling of these general purpose bombs is described in this report. The method described is based on procedures used at the Keeraska Ordnance Plant as of June 1944. Lists of parts and materials, equipment needed, production rates, and photographs of operations accompany the detailed instructions. Machines, tools, gages, etc. used are listed on pertinent operation sheets.

PB 24857. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, G. P., 2000 lb., AN-M66, straight TNT loaded. Nov 1943. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
Detailed instructions for the loading and assembling of this 2000 pound bomb, unfused without fin assembly, are given in this report. The information is based on the methods used at Elwood Ordnance Plant as of August 1943. The detailed descriptions of consecutive operations are accompanied by lists of materials and tools needed and by photographs of equipment and operations.

PB 24858. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Cartridge H. E.-T (SD, M3) Mk. II for 40 mm. AA guns. Dec. 1943. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
A method of loading, assembling and packing this high explosive, tracer cartridge is described in detail. The information is based on the method used at the Lone Star Ordnance Plant as of December 1943 and was compiled for a record and for the guidance of loading contractors. The descriptions of consecutive operations are accompanied by lists of parts and materials, tools needed and production rates, and by photographs of equipment and operations.

PB 24859. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Cartridge, HE-T, T18E2, with fuse, P. D., T86 for 57 mm. guns. Jun 1945. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
A method of loading, assembling and packing of the subject cartridge and fuse based on the methods used at the Sangamo Ordnance Plant, as of May 1945, is given in this report. The procedures for each consecutive operation which are outlined herein were compiled for the guidance of loading manufactures. Lists of materials and equipment needed, production rates, and photographs of equipment and operations illustrate the procedures.

PB 24839. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Charge, burster, M5. Dec 1942. 26 p. Price: Microfilm-50¢ - Photostat-$2.00

Descriptions of each operation needed in the loading, assembling and packing of the burster charge, M5, is given herein. The information is based on the production method used by the Redstone Ordnance Plant, Alabama. Each operation is described in detail on a separate sheet which also contains lists of material and equipment required. Photographs of equipment and operations accompany the instructions. Lists of parts and materials are given.

PB 22770. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Charge, propelling, 105 mm. howitzer, M3. May 1945. 154 p. Price: Microfilm-$2.00 - Photostat-$11.00
This report describes methods employed as of April 1945 at the Hoosier Ordnance Plant of bag manufacturing, loading, assembling and packing of the charge, propelling, 105 mm howitzer, M3. Photographs of each step, with explanatory notes, are used. Detailed inspection instructions are given. Machines, tools, gages, etc. actually used are listed on pertinent operation sheets.

PB 24844. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Detonator, M24. Apr 1944. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
Method of loading, assembling and packing the M24 detonator, based on procedures used as of Jan 1944 at the Arkansas Ordnance Plant, is described. Photographs with notations are shown for various steps of the operations. Machines, tools, gages used are listed on pertinent operation sheets. Lists of parts, materials, drawings and manufacturers are included.

PB 24849. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, C. P., M78. Jun 1945. 82 p. Price: Microfilm-$1.00 - Photostat-$6.00
Method of loading, assembling and packing of the fuse, C. P., M78, based on procedures used as of May 1945 at the Sangamon Ordnance Plant, is described. Photographs with notations show each step of the operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are included.

PB 24841. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, mine, A. T., M1A2 practice. Aug 1944. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
Method of loading, assembling and packing of the M1A2 practice, A. T., mine fuse, based on procedures used as of Apr 1944 at the Iowa Ordnance Plant, is described. Photographs with notations are shown for all steps of the operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are included.

PB 24852. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, P. D., M51A3. Oct 1944. 112 p. Price: Microfilm-$1.50 - Photostat-$8.00
Method of loading, assembling and packing of the fuse, P.D., M51A3, based on procedures used as of Sep 1944 at the Sangamon Ordnance Plant, is described. Photographs with notations show each step of the operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are included.

PB 24848. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Fuse, P. D., M56. Mar 1944. 140 p. Price: Microfilm-$1.50 - Photostat-$10.00
Method of loading, assembling and packing of the fuse, P. D., M56, based on procedures used as of May 1943 at the Louisiana Ordnance Plant, is described. Photographs with notations show each step of the operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are included.

PB 24854. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Mine, A. T., light, T-7 (tetrytol loaded). Jul 1944. 26 p. Price: Microfilm-$0¢ - Photostat-$2.00
A method of loading, assembling and packing of this anti-tank mine is described in detail in this report, the information given being based on methods used at the Iowa Ordnance Plant as of April 1944. Photographs of equipment and operations accompany the instructions. Machines, tools, gages used are listed on pertinent operation sheets. Lists of parts and materials are given.

PB 24840. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Photo-flash bomb, M46. May 1944. 26 p. Price: Microfilm-$0¢ - Photostat-$2.00
Detailed descriptions of operations used in the loading, assembling, and packing of this photo-flash bomb are given in consecutive order in this report. The information is based on methods used at the Triumph Explosives, Inc. plant at Elkton, Maryland, as of May 6, 1944. Lists of equipment and materials needed accompany the description of each operation.

PB 24851. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Primer percussion M29. Apr 1945. 28 p. Price: Microfilm-$0¢ - Photostat-$2.00
Method used in loading assembling and packing primer percussion at the Arkansas Ordnance Plant as of Apr 1, 1945 is described. Photographs with notations show each step of the operation. Lists of parts and materials are included.

PB 24846. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Primer, percussion, M32. Sep 1944. 38 p. Price: Microfilm-$0¢ - Photostat-$3.00
A method of loading, assembling and packing this percussion primer is described in this report. The information given is based on methods used at the Wolf Creek Ordnance Arsenal as of May 1944. Detailed procedures are outlined. Photographs of equipment and operations accompany the instructions. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials and of available tool and equipment drawings are given.

PB 24837. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Processing lead azide. Apr 1944. 22 p. Price: Microfilm-$0¢ - Photostat-$2.00
A method of processing lead azide prior to loading is described in this report. The information is based on methods used at the Arkansas Ordnance Plant as of January 1944. Step-by-step descriptions of each operation are given, accompanied by photographs of equipment and operations and lists of the materials needed. Information is also given on the transfer of lead azide to the loading building. Machines, tools, etc. used are listed on pertinent operation sheets.

PB 22764. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Round, complete, H.E. M1, for howitzer, 105 mm, M2 (straight TNT loaded). Dec 1943. 69 p. Price: Microfilm-$1.00 - Photostat-$5.00
This manual describes the method of loading and assembling the ammunition for the 105 mm howitzer according to methods used at the Elwood Ordnance Plant. Photographs illustrate every step of the process described. Machines, tools, gages, etc. actually used are listed on pertinent operation sheets.

PB 24861. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Round, complete, projectile, A.P.C., 75 mm. M61. Dec 1943. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00
A method of loading, assembling and packing the subject projectiles based on the methods used at the Green River Ordnance Plant, as of August 1943, is described. The information was

compiled as a guide for loading contractors and gives detailed descriptions of each operation, together with lists of parts and materials, equipment, and numerous photographs of the equipment and operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. A list of available tool and equipment drawings is given.

PB 24860. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Round, complete, shell, H. E., M46, semi-fixed (with M48A2 P. D. fuze) for 75 mm. howitzer, M1, M1A1, M2 and M3 packed in metal container. Mar 1945. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
Descriptions of the consecutive operations in the loading, assembling, and packing of this high explosive shell are given. The information is based on methods used at the Louisiana Ordnance Plant as of February 1945. The detailed instructions are accompanied by lists of materials and tools needed, rates of production, and photographs of equipment and operations.

PB 24862. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Shell, H. E., M73 for 120 mm. gun M1. Jul 1944. 87 p. Price: Microfilm-$1.00 - Photostat-$4.00
A method of loading, assembling and packing this shell with a mechanical time fuze is given in this report. The information is based on methods used at the Kansas Ordnance Plant as of July 1944. Each operation is described in detail on a separate sheet on which is given a list of materials and tools needed and also the rate of production. Photographs of the equipment and operations accompany the descriptions of procedures. A list of tool and equipment drawings is given.

PB 24863. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Shell, H. E., M101, unfuzed, for 155 mm. gun. Jun 1945. 130 p. Price: Microfilm-$1.50 - Photostat-$9.00
Step-by-step procedures in the loading, assembling and packing of these high explosive shells are described in this report, the information being based on methods used at the Ravenna Ordnance Center at Apco, Ohio, as of June 1945. The descriptions of consecutive operations are accompanied by lists of materials and tools needed, production rates and photographs of equipment and operations.

PB 24847. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Signal, distress, 2 star, red, M75 (49). Apr 1945. 66 p. Price: Microfilm-$1.00- Photostat-$5.00
The operations necessary in the loading, assembling, and packing of the distress signal named above are described in detail. The information is based on the methods used at the Unexcelled Manufacturing Company Plant located in Port Richmond, N. Y. as of April 1945. The operations are listed consecutively and lists of materials and equipment needed for each operations are given.

PB 24845. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Signal, ground, white star, cluster M18A1. May 1945. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
Method of loading, assembling and packing ground, white star, signal cluster M18A1, based on procedures used as of May 1945 at the Unexcelled Manufacturing Company plant, Reading, Ohio, is described. Photographs with notations are shown for all steps of the operations. Machines, tools, gages, etc. used are listed on pertinent operation sheets. Lists of parts and materials are included.

PB 24842. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Signal, 1 inch distress, single star, red, M73. Apr 1945. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
Each operation in the loading, assembling and packing of this distress signal is outlined on a separate "description of manufacture sheet" which notes parts, materials and equipment needed, and describes the operation. The method is based on that used at the Delmar Manufacturing Company, of Bear, Delaware, as of April 1945.

PB 23393. U. S. WAR DEPARTMENT. Inspection of ordnance materiel. (Tech Manual 9-1100) May 15, 1944. 102 p. Price: Microfilm-$1.50 - Photostat-$7.00
This manual covers the responsibilities and certain fundamental duties of inspecting personnel, the preparations necessary for inspection, the proper forms to use in recording the results of inspections, and certain general procedures and methods to be followed in ordnance inspections conducted by inspecting representatives of ordnance units attached to either the Army Air Forces, the Army Ground Forces, or the Army Service Forces. The inspections referred to herein are technical inspections made for the purpose of examining and servicing ordnance materiel in the hands of troops, or in storage for issue to troops, at posts, camps, stations, and installations in the zone of the interior and in the theater of operations. Sample inspection forms and a list of references are included.

PB 23406. U. S. WAR DEPARTMENT. 20-mm. automatic gun M1 and 20-mm aircraft automatic gun AN-M2. (Tech Manual 9-227) Jun 1, 1943. 131 p. Price: Microfilm-$1.50 - Photostat-$9.00
This manual contains information of a technical nature required by the personnel of the Army and Navy for the identification, use, care and preservation of the 20 mm. aircraft automatic gun AN-M2, and of the accessories and ammunition used therewith. The 20 mm. automatic gun is a combination blowback and gas-operated aircraft weapon. The gun is air-cooled and has a cyclic rate of fire of 600 to 700 rounds per minute. It is designed for mounting as a fixed gun in the wing or fuselage of an airplane. It may also be mounted to fire through the hub of the propeller, and may be mounted as a flexible gun in a turret. The gun cannot be synchronized to fire between the propeller blades of an airplane. Photographs and a list of references are included.

PB 23413. U. S. WAR DEPARTMENT. U. S. rifle, cal. .30, M1903A4 (Sniper's) characteristics and operation; and use of telescopic sight. (Tech Manual 9-270) Sep 28, 1943. 28 p. Available from the Supt Docs, Washington 25, D. C. 10¢
This manual describes the subject rifle and tells how it differs from the M1903, M1903A1 and M1903A3 rifles, all Springfield rifles. The Weaver telescopic sight No. 330 C with which this weapon is equipped is also described. Detailed instructions for the care of the rifle and sight are given, and numerous photographs are included.

PB 22872. URRY, WILLIAM D. and HAHNAN, P. J. The state of equilibrium among the carbon atoms of a propellant gas. (NDRC Armor and Ordnance Rept A-303; OSRD Rept 4461) Dec 1944. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
The thermodynamic calculations of the properties of propellant gases in gun tubes may now be proven by the addition of "tagged" atoms to the reactants. In the experiments described here atoms of radioactive carbon were added to a single-base propellant in the form of a coating of radioactive barium carbonate on the grain surfaces. Comparison of the radioactivity of the various carbon gases resulting from combustion under various conditions showed whether or not the carbon atoms in the carbon gases were in atomic equilibrium, and hence whether the system could be considered as in thermodynamic equilibrium. In an experimental arrangement which approached conditions for the gases in a gun tube, it was shown that about 1 percent of radioactive barium carbonate thus incorporated into a propellant is completely dissociated and that the radioactive carbon is uniformly distributed between the carbon dioxide and carbon monoxide. Thus, radioactive carbon can be used to determine the penetration of carbon into the bore surface of gun tubes. Photographs of apparatus and tables are included.

PB 25794. WALLIS, C. H. The development of a flat-shaped C.N. candle. (Edgewood Arsenal Chemical Div Rept 335) Mar 1925. 35 p. Price: Microfilm - $1.00 - Photostat - $3.00
The best results of the investigation were obtained with a burning mixture composed of 29.2% chloroacetophenone, 68.3% .30 calibre smokeless powder, and 2.5% magnesium oxide as a stabilizer. The mixture is prepared in a manner similar to that of the standard chloroacetophenone candle, and then molded into a block of the proper dimensions. Before placing the block in the container the extra burning surface on the sides and bottom is eliminated by applying a coating of chloroacetophenone by immersing the block to the proper depth in melted chloroacetophenone. The weight of the finished block is approximately 364 grams. The burning mixture is ignited by means of a matchhead in the cover and a starter bound to the surface of the block. The time of evolution of the cloud is 4 to 4½ minutes when the candle is first made, and after one year in storage, lengthens to 5 to 6 minutes. Diagrams of the candle and of the 2-pound Mark I hexachloroethane candle container are appended.

PB 25785. WEAVER, F. R. The development of a 25-lb. C. N. aerial bomb, non-explosive, burning type (experimental). (Edgewood Arsenal Chemical Div Rept 309) Feb 1924. 36 p. Price: Microfilm-$1.00 - Photostat-$3.00
This chloroacetophenone bomb was developed for land use. A description of the experimental work, the details of loading and functioning, and the specifications for the bomb are included in the report. The bomb functions on impact and evolves a highly lachrymatory cloud for from six to fifteen minutes. A table of the preliminary development of mixture and the method of loading and a table of test results are included. A diagram of the bomb is also shown.

PB 20708. WILLIAMS, C. M. Development of a chloroacetophenone combination hand and rifle grenade. (Edgewood Arsenal Chemical Div Rept 162) May 1922. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
A grenade has been developed that will generate chloroacetophenone vapor over a period of 30-45 seconds and will not explode. It can be used both as a hand and a rifle grenade. The standard U.S. grenade container and the firing device of the British No. 27 rifle grenade are used with simple modifications. The grenade is loaded by filling with the dry mixture (chloroacetophenone, smokeless powder and magnesium oxide) softening this to a paste by heating on a water bath and finally tamping it down. Three drawings of the grenade and full directions for loading and assembling are included in the report.

PACKING AND PACKAGING

PB 23111. HAWKINS, W. C. Modified M-1 aerial delivery container: Test report. (Marine Corps Equipment Bd Project 442) Nov 1945. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
The purpose of the test covered by this report was to compare the suitability of the modified M-1 aerial delivery container and the standard M-1 aerial delivery container to determine: a. Adaptability to various types of cargo; b. waterproofness; c. flotation; d. types of aircraft with which subject container may be used; e. size and weight; f. durability; g. safety. Proceedings and findings of tests are described. Photographs are included.

PB 22144. U. S. ARMY FORCES IN THE PACIFIC. MEDICAL ANALYSIS SECTION. Container, medical, air drop, W/chute. (Rept 172) Feb 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Two samples of this item which are identically constructed except for the difference in color and material used in the parachutes are described briefly. The containers are of compressed fibreboard with wooden ends and probably were part of a set, and held various classes of medical supplies which could be identified rapidly. Photographs are included.

PAPER AND ALLIED PRODUCTS

PB 22794. HALEY, LAWRENCE B. Cellulose from straw by the T. C. V. process. (U.S. Embassy, France. Rept 190) Jan 1946. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a brief summary of a patented process owned by an organization known as Traitements Chimiques des Végétaux, located in Paris. The data and information contained in this report were drawn largely from the descriptive literature of this company, particularly a bulletin entitled "De la paille à la cellulose (From straw to cellulose) par les procédés T.C.V." This process involves the treatment of straw by nitric acid and among the advantages claimed for the process is the production of cellulose of a very regular quality in less than one and one-half hours treatment under atmospheric pressure. The process is said to produce a paper of superior quality, suitable for books, magazines, etc. The process was developed in 1942 and T.C.V. was created in that year to exploit it. The process is patented in France but because of the war it has not been possible to patent it in all countries. The patent licenses reveals the complete process. The owner will give confidential information on any phase of the process to those who wish to buy it. The report includes brief data on materials required per metric ton of cellulose and by-products. It is stated that it is advantageous to operate on a large scale, and estimated comparative costs are given in the company's literature for 3,000 tons, 30,000 tons and 300,000 tons per year with the annual profit margin computed at 70%, 101% and 128% of invested capital, respectively.

PERSONNEL APTITUDE TESTING AND JOB TRAINING

PB 22917. GARRETT, HENRY E. and LIGON, ERNEST M. Report to applied psychology panel on project concerned with combat leadership. (NDRC Applied Psychology Panel Rept 759) May 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report embodies a study of the methods employed in evaluating leadership potentiality of young men in officer candidate schools. The data analyzed in this study consists of records of two classes at the Fort Benning Infantry School, two classes at the Fort Sill Field Artillery School, and a group of officers who were graduates of Fort Benning. Intercorrelations among selected items are given for the officer candidate groups. In analyzing the data relative to the officers the following conclusions were stated: (1) It seems clear that combat efficiency is not very closely related to ratings for leadership obtained in OCS; (2) there is some indication that the best officers come from the age range 22 to 28; (3) it is reasonably clear that above a certain desirable minimum, intelligence as measured by a GCT has little relevance to combat performance. PB 22918 is an earlier memorandum dealing with the same subject.

PB 22918. HUNTER, W. S. Study of combat leadership. (NDRC Applied Psychology Panel Memo 91) Mar 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This memorandum reports work done on examining the present procedures for determining combat leadership of men in officer candidate classes. The procedures at the Infantry School at Fort Benning and the Field Artillery school at Fort Sill were studied. In conclusion it was stated that the OCS method of evaluating the degree to which a man possesses leadership qualities seems to be too impressionistic and is perhaps too "clinical". However the combined judgement of candidates, platoon leaders, company commander and very often officers' board, probably results in the selection of the best candidates and in the rejection of most of the misfits. PB 22917 is a more complete report on this subject.

PB 19819. KELLEY, TRUMAN L. An activity-preference test for the classification of service personnel. Final report. (OSRD Rept 4484; NDRC Applied Psychology Panel Rept 407) Dec 1944. 168 p. Price: Microfilm-$2.00 - Photostat-$12.00

This report shows the successive steps taken by Harvard University in devising and developing an activity-preference test which for each person tested furnishes a number of different scores corresponding to clusters of functionally-related activities. Psychologists both in and out of the Army collaborated in selecting and judging the importance of interest, attitude, and preference dimensions in connection with known facts about individual differences and about differences in need, especially military need. These dimensions were classified and combined and, after preliminary correlation and reliability study, were reduced to 34, which are designated rubrics. Some 3800 enlisted men in three Army camps were tested, and those between the ages of 19 and 26 inclusive were scored on the 34 rubrics. The prospective fields of utility of the test are in connection with the induction, classification and assignment of enlisted personnel, special service demands, the rehabilitation, training and placement of discharged military personnel, and nonmilitary personnel whose activities have been disrupted through industrial retrenchment or reconversion. The following appendices are included in the report: A. Sources examined and utilized with reference to rubrics and items; B. rubric definitions and weights; C. directions for administering; D. test booklets and answer booklet; E. rubric scoring keys; F. selected abstracts from monthly progress reports; G. component scoring keys. Tables and charts of profiles are included.

PB 25318. THURSTONE, ROBERT L., ed. Research problems and techniques (preliminary draft). (AAF Aviation Psychology Program Res Rept 3) May 1946. 169 p. Price: Microfilm-$2.00 - Photostat-$12.00
This report undertakes to summarize the procedures which were developed and the problems which were encountered in the Aviation Psychology Program of the Army Air Forces, and more particularly in that portion of it which was concerned with the selection and classification of personnel for aircrew assignment. This report does not make a complete statement of statistical methodology. Reports 5, 6, (PB 18681, p. 1269) and 18 of this series give additional material on the methods used. This volume presents a general discussion of the research problems which were encountered. The sequence of chapters follows in a general way the sequence of operations in test development. These chapters follow the introduction: Job analysis problems and procedures; The invention and refinement of aptitude test forms; Problems in determining an adequate criterion; Determining the validity of single tests; Obtaining composite aptitude scores; Problems associated with reliability and reliability determination; Problems in correlational analysis; Sources and control of error in test scores; and Training experiments. The necessary graphs, charts, curves, and tables to show test results are included in the report.

PB 25718. U. S. ARMY AIR FORCES. AVIATION PSYCHOLOGY PROGRAM. Psychological research on operational training in the Continental Air Forces (preliminary draft). (Res Rept 16) 1946. 658 p. Price: Microfilm-$14.00 Photostat-$44.00
This report is a summary of research accomplished on operational training by aviation psychologists in the Continental Air Forces during the latter part of World War II. Research personnel were sent to the headquarters of the four air forces to carry on the necessary research in the special fields covered by the individual air forces in their training program. In the First Air Force attention was directed toward fighter pilots and a procedure was established for following all students through their entire training program in the First Fighter Command. The emphasis in the Second Air Force was on the training of heavy bombardment crews in the beginning but as B-29's replaced B-17's and B-24's in the autumn of 1944 the emphasis shifted to very heavy training. The Third Air Force trained some fighter pilots and it also trained crews on B-17's and B-29's. The Fourth Air Force was concerned largely with training B-38 fighter pilots and with training B-24 crews. From the work done in these four headquarters this volume has been assembled. The first chapters are divided by aircrew specialty, outlining the job requirements, methods for measurement of proficiency in the specialty, relation of achievement of individuals on selection and classification tests to measured performance on the job. Chapters are devoted to the following: The fighter pilot; photo-reconnaissance pilot; airplane commander; co-pilot; navigators; the bombardier; flight engineer, radar observer; and gunners. Following these chapters is a chapter on the crew as a whole which discusses the problem of evaluating a crew as a working team, achieving a common goal, rather than as a collection of specialists. There is also a chapter on the acquisition and retention of aircrew skill and a discussion of attitudes of aircrew personnel returned from combat toward further duty. The final chapter summarizes the more important conclusions which came out of the work. Criteria and the validity of stanines and classification test scores are discussed in this chapter. Charts, tables, graphs, and curves appear throughout the report. The appendix contains rating scales, personal inventory sheets, and questionnaires used for the various groups. The volume is indexed.

PB 23072. VENPLANCK, W. S., JR. Night vision testing of members of crew of the U.S.S. New Jersey. (Bur of Medicine and Surgery Project X-167) Jun 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the procedures in testing two groups of men by means of an NDRC adaptometer model III using the 10-20-30 procedure and employing a test level of brightness 3.70 log micromicrolamberts. The tests were designed with several purposes in mind. Primarily, it was desired to select personnel with superior vision for the L Division which has cognizance of all surface and horizon lookouts. Secondarily it was hoped to disqualify for night work those men of the gunnery department whose night vision failed to meet certain standards. It was concluded that this testing procedure would be a valuable part of any testing plan which is directed at the proper classification of personnel.

PB 23046. WIGGIN, B. E. and BARTLETT, N. R. Development of a method for obtaining personal preferences from within small groups, and the relationship of such evaluations to other psychiatric and psychological data. (Bur of Medicine and Surgery Res Project X-246) Jan 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report from the Medical Research Department, U. S. Submarine Base, New London, Connecticut, states that the problem of furnishing reliable personal classification data for certain service tasks is a most pressing one. Medical and selection departments have evolved standard tests and interview techniques that have proven useful. According to what we have been able to learn, however, grading techniques and classification procedures within some service schools have not been so developed. Typically, classification grades are assigned by an experienced instructor after some systematic observation or test of the men to be graded. The personal preference technique described in this report employs instead the opinions of many who are not expert, but who have had opportunity for more adequate observation of each other than is ever possible for an instructor. The technique was investigated for its feasibility as a supplement to instructors' grades. Tables are included.

PHOTOGRAPHIC AND OPTICAL GOODS (INCLUDING PHOTOGRAPHIC PROCESSING)

German

PB 23493. BRITISH NAVAL GUNNERY MISSION, MINDEN, GERMANY. German docket on blooming of optical glass surfaces for the reduction of reflection. Result of a questionnaire to firms; comparison of different processes. Feb 1943. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a translation of a German document which lists the reflection reducing layers, and processes used in producing these layers, of the following companies: Askania, Leitz, Schott, Zeiss and Steinheil. It also lists the answers made by these firms to fifteen questions, among them are the fol-

lowing: (1) Up to what size and curvature of lenses can blooming be provided for by the various processes? (2) How big is the optimum obtainable transmission for a plate treated on both sides, disregarding absorption? (3) What minimum transmission can be guaranteed for mass production? (4) What relation does the transmission bear to the color of the light? (5) Within what boundaries can a definite color transmission relationship be maintained in factory work? (6) What in general is the durability of the reflection reducing layers and what durability under normal conditions can be guaranteed? (7) What is the mechanical strength? Is it sufficient for outer or inner surfaces and in what way is it tested? and (8) Will the optical properties of the bloomed surface endure if they are exposed for a long time to an atmosphere containing grease vapor of 80°C.? Other questions are concerned with water and tropical proofing, and the time and expense required in mass production.

PB 25006. FRILDEN, G.B.R. Report on high speed camera in building M12 (room 114a), and interrogation of Dr. U. Heubert of LFA. (BIOS Halstead Exploiting Centre Rept 554) n. d. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The high speed camera described in this report has operated at speeds up to 25,000 pictures per second. The duration of each spark is of the order to one microsecond and the intensity is sufficient to give an adequately exposed negative on a 27° Schleiner film when using a f/4.5 objective with the Schlieren apparatus. Intermittent spark illumination is used in conjunction with a simple rotating drum camera. This apparatus has been used for fundamental research on flame propagation in gas air mixtures, observations being made by the Schlieren method. A diagram of the camera and a circuit diagram are appended.

PB 23184. GARDNER, IRVINE C. Binoculars for night-seeing. (CIOS File XXXI-14, Item 9) Jul 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The German Army was much interested in the development of means for detecting airplanes at night, and had not fully decided whether this could best be accomplished by short electromagnetic waves, by infra red, or by night seeing with the eye. Accordingly, research was directed toward the further development of each of the three methods. In this connection Zeiss developed the binocular with a 200 mm. objective and magnifications of 40 and 25. Originally two uses for this instrument were foreseen. In the first, the binocular was to be used with either an electromagnetic or an acoustical device as a finder. In the second, the binocular was to be used as a finder, the observer sweeping the sky continuously. How the binoculars would function for these purposes is discussed in this report. Ten of these large binoculars were ordered and were under construction shortly before the end of the war. The mounts were also under construction, but the work on them was completely destroyed in the bombing of March 1945. In the meantime Emil Busch had also constructed a large binocular and it was mounted on a base made by Siemens and Schuckert of Nürnberg. It was finally decided that the construction of the 40 x 200 binocular required too many man-hours, and that it could not be manufactured in the quantities desired. As a compromise the 25 x 100 binocular was selected as the instrument to be built. Procedures and findings of experiments with these binoculars are described briefly.

PB 25689. HARCOURT, WILLIAM M. Agfa colour. (BIOS Final Rept 397, Item 9) Jan 1946. 20 p. Price: Microfilm-$1.00 - Photostat-$2.00
This report consists of three reports on the Agfa color developments in Germany. Report I on Agfa color and the negative positive process gives the broad principles of the method and includes detailed technical information of the processing of Agfa color negative and positive, including information on processing with color and with black and white sound tracks, formulae for baths and bleaching, color filters and color developer. Report II includes information on the very limited possibilities of film production in the British Zone and on the availability of dubbing facilities at the Mars Laboratory at Spandau, Berlin. Also included is a report of a conversation with Bruno Janssens, ex-chief sound engineer of UFA studios, who told of the new play-back machine which employs an ironized tape. The advantages of these machines are that the ribbon can be cut and edited and joined similarly to any other film and may be played back, without any background noise, eight or nine hundred times. The tape may be de-magnetised at will and used again. Report III contains a description of an Agfa color negative paper process which works in the same way as the positive used in the film and is so simple to use that any amateur can contact print or enlarge and develop in his own home. The author indicates that the potential value of this process for amateur purposes is very great.

PB 23522. JANAK, P. A. German ZAK 35, gun camera. (AAF ATSC Memo Rept TSEPF-447-1) Apr 1946. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
Subject item is a 35 mm. 24 volt electrical operated all purpose aerial motion picture camera. It may be used as a gun camera or a flexible camera for reconnaissance and bomb spotting purposes. The camera is rather sturdy and reliable. The shutter assembly and film claw mechanism are somewhat similar to the Bell & Howell camera, and are very reliable. The main drive mechanism is very satisfactory, but there are no means of changing the speeds of the camera. The timing light indicator is quite accurate and gives the exact time of length of each burst. Photographs are included.

PB 19905. JOHNSON, OSCAR G. German 21/18 aerial camera WR #429. (AAF ANC Memo Rept TSEPF-675-189-9) Mar 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This evaluation report describes a semiflexibly mounted low altitude, electrically operated aerial camera intended for vertical exposure with a certain overlap to be used generally for mapping and charting or topographic application. The appendix contains one photograph made with this camera and a series of photographs of the camera.

PB 23013. KATLIL, D. A. An investigation into the land and air service fire control instruments designed and made by Carl Zeiss, Jena; and also into the production of optical glass by Schott und Genossen, and its working into lenses and graduated scales by Zeiss and others. (CIOS File XXV-8, Item 9) 1945. 152 p. Price: Microfilm-$2.00 - Photostat-$11.00
Firms visited were as follows: Carl Zeiss and Schott & Genossen, Jena; Voightländer and Frank & Heidecke, Brunswick; and Schneider Opt. Werke, Göttingen. The Carl Zeiss Works at Jena, employing several thousands, were throughout the war the center of the German instrument industry. It was here that the "Hauptausschuss Feinmechanik und Optik" or Main Commission for Optical and Precision Instruments, the organization through which Reichsminister Speer obtained the necessary instruments for his war production program, had its headquarters. A great part of the development of German military optical instruments, as well as crystal oscillators and other electrical equipment, was carried out here by the highly trained Zeiss staff. Although considerably damaged during an air attack in March 1945, this plant is still capable of a large output of optical instruments. Fire control instruments. 1. Development of M.A.A. instruments had been discontinued about 1942 when modifications to the Kommandogerät 40 had been designed and introduced to make it suitable for mass production. 2. Schematics of three new instruments were obtained: The Flakrechner 42, a static computer using cartesian coordinates; the Kling 2, a mass auxiliary predictor to the Kdo. 40; and the A. 3, a cartesian coordinate instrument with arrangements for feeding in present position data in any of the recognized forms. Project was abandoned as too unwieldy. 3. The fundamental theory of a guided missile predicter (which had not been made) was obtained; and is presented in this report. 4. "Archimedes" was the name given to a mechanical computing instrument which was to be part of an apparatus intended to control anti-aircraft rockets. The idea was to launch a rocket in the general direction of the

aircraft and to control it by radio from the ground in such a way that it would follow the line of sight to the target; when the target was reached it would be detonated by remote control or proximity fuse. 5. No evidence was found to indicate that Zeiss was designing light anti-aircraft sights embodying radically new principles. Their latest instrument, the Optisches Einstellvisier, of which only one prototype is available, is based on the well-known course and speed principle. It is described herein. The only difference between this and other previous designs is in the technique of applying the principle mechanically and in the general arrangement. 6. The latest design of German anti-tank sights is also described. It was to be the standard sight for all tank, anti-tank and anti-aircraft guns, when used in the ground role. 7. New aerial bomb and gunsights are described. Air cameras and air survey equipments. On visit to Zeiss Aerotopograph, Jena, a considerable amount of air cameras and plotting apparatus was seen, including Stereo Comparator, Stereopantometer and rectifying enlarger S.E.G.I. Equipment and information were obtained at the Carl Zeiss Works, Jena, including 5 air cameras of new types, new type lens, new type lens, new type phototheodolite, and a coordinate comparator having exceptional accuracy. Aircraft Instruments. 1. A new radio altimeter and electro-optical spot-height altimeter were devised. The latter was originally intended to control pilotless aircraft to a constant height of the order of 10 to 20 meters. In a later application the transmitting and receiving mirrors were fitted on a 35 cm. base in the wing of an air-launched flying bomb, at the Blohm & Voss Works, arranged to blow off the wings at the pre-set height. Zeiss engineers understood that a simple mechanical solution had been found using downward antennae (probably HS 294). 2. Zeiss production of quartz crystals is also described. Electrical Section: This Section showed a well-advanced technique in a limited range of electronic instruments. A good design for a radio altimeter had been produced, and piezo crystal production had been extended to include quartz fundamental oscillators of frequency 60 m/cs. A photo-electronic instrument was produced which enabled the delay times to be measured of anti-aircraft fuses under service conditions. Another instrument based on similar principles enabled an automatic photographic record to be made of the position of anti-aircraft shellbursts under day or night conditions. Infra-red: Production methods for lead sulfide infra-red photo cells are described briefly. Optical instruments and production methods. 1. Items studied in detail were photographic articles of which Zeiss makes ten types, optical element grinding equipment, which is well designed and widely used, and spherical lens grinding and polishing equipment. The latter equipment is of considerable interest since the production rate is quite high. Lenses are made for photographic equipment (not camera lenses); eyepiece and endura lenses for fire control equipment; opthalmic devices. All phases of optical element production are well advanced and merit additional study. The application of reflection reducing film requires considerable study, and the molding and annealing of pressings require further investigation. 2. Considerable information was obtained from Schott & Genossen on glass-making methods and the technique of producing non-reflecting films. 3. Descriptions are given of a precision potentiometer winding machine and of a three-dimensional cam making machine. Data on all the above-mentioned items are presented in the appendices, accompanied in many cases by sketches, photographs, diagrams and tables. A brief report on Gerhardt Heydrich states that nothing of interest was found. Lists of equipment requisitioned for examination and of documents removed for reference are included. Value in RM of deliveries of military optical instruments to Japan by Zeiss and lists of research institutions in this field are given.

PB 22723. KUHN, BRIGITTA, tr. Description, operation and maintenance instructions for RB.20/30 aerial camera. (AAF ATSC T-2 Translation 480) Mar 1945. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
This camera is intended for vertical and aerial exposures with a certain overlap of the consecutive images taken from medium and low altitudes. Exposures with this camera are designed for air photogrammetry according to the rectifying method or for stereoscopic measurement and topographic application. The description, operation and maintenance of the electric drive with stepped speed control for aerial cameras is given following the manual proper. The description and operating instructions for the photogrammetric film changing magazine FK 3030/32 completes the report. The photographs which illustrated the original German document are missing from this translation.

PB 24979. MARX, P., tr. Cinematographic study of the phenomena of expansion accompanying large scale explosion in Deba, autumn 1942. (BIOS Halstead Exploiting Centre Rept 247) Jul 1944. 83 p. Price: Microfilm-$1.00 - Photostat-$6.00
The problem was to take a cinematographic picture of what happens when bodies of untamped explosive are detonated, starting with the beginning of the detonation, and to ascertain also the form the expansion takes, and the rapidity with which it occurs, particularly in the first milliseconds after the ignition. By optical phenomena in this case is meant all variations of light against the surroundings, which occur with or following the detonation: Flashes, fine jets of light or any other emanations of light from the flaming or burning gases, and it also includes the transient, thick, very dark gases or particles of dust (swathes) which obscure the light. From the aggregate of these expansion phenomena photographs are taken of those which visually pass the strongly screened lenses, and which are registered by the sensitive layer of the black-white film. The experiments took place from October 2, 1942 to November 16, 1942, and the films were made by the Government Institute for Films and Pictures in Science and Education. Drawings, graphs and helioprints are included. Translated from the German.

PB 23647. METZGER, HENRY, JR. Instructions for use and maintenance of the statoscope-recording camera; edited by Ludwik Hausknecht. (AAF ATSC T-2 Translation 522) Mar 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of a captured German document from Zeiss-Aerotopograph, G.m.b.H., Jena, which gives detailed instructions for the use and maintenance of a statoscope recording camera. When making reconnaissance flights for aerial triangulation, it is important to keep the aircraft in level flight and to determine any variation above or below the mean altitude so that such data can be used as reference values for evaluation purposes. The use of this equipment solves the problems involved inasmuch as the pilot controls the flight by means of a pilot's statoscope, and while taking aerial pictures of the terrain, the registrations of a statoscope, synchronized with each individual picture, are recorded by a recording camera controlled by the aerial camera. Registration of the statoscope corresponds with that of the pilot's statoscope. Descriptions of the component parts and their operation, together with a number of drawings, and diagrams are included.

PB 23756. RANGER, R. H. I. G. Farben, AGFA subsidiary, Wolfen, Germany (near Leipzig). (CIOS File XXX-17, Item 9) Sep 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report deals with the negative-positive color process which was perfected by Agfa sometime after 1939. The negative-positive process, which has the advantage of normal photographic sequence, giving the opportunity for multiple copies of equal qualities, for ready enlargment and for tone correction on positive printing, is described. A few practical points relative to the development of this film are given.

PB 23642. KUNKLE, ALBERT D. The Arriflex 35 mm motion picture camera. (FIAT Final Rept 802) Mar 1946. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report deals with the construction and operation of a 35 mm motion picutre camera which uses a new reflex type viewfinder. The camera is primarily a hand held camera especially applicable for news and combat work where stable light weight equipment is required. A schematic drawing of the viewfinder and photographs illustrate the report.

PB 19879. U. S. ENGINEER BOARD. German coordinatograph: Evaluation report. (Registration 3241) Mar 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a coordinatograph which was manufactured by Carl Zeiss. The instrument is used for plotting or reading rectangular coordinates or for laying out rectangular grids. There is a photograph of the equipment.

PB 19880. U. S. ENGINEER BOARD. German 1.4-meter and 1.7-meter multiplex tables: Evaluation report. (Registration 3251, 3252, 3311) Mar 1946. 4 p. Price: Microfilm 50¢ - Photostat-$1.00
Each of these tables is of wood-frame construction with detachable metal legs and glass top. There are metal inserts at the ends of the top of the table, with properly positioned slots and holes into which the feet of the multiplex frames are seated. A detachable shelf is provided which may be mounted on either end of the table for the multiplex voltage regulator and other accessories. These tables can be used only with German multiplex equipment, which requires reduction printers to adapt it to U.S. Army photography. As these printers are not available, the equipment cannot be used by U. S. Troops. Photograph of German multiplex table, 1.7 meter, is included.

PB 19884. U. S. ENGINEER BOARD. German photogoniometer: Evaluation report. (Registration 3287) Mar 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This photogoniometer, manufactured by Gustav Heyde, is designed for use with horizontal terrestrial photographs of approximately 165 mm in focal length and 13 x 18 cm in size, for the purpose of measuring vertical and horizontal angles thereon for use in map compilation or photogrammetric survey. There is a photograph of the equipment.

PB 19883. U. S. ENGINEER BOARD. German stereoplanigraph: Evaluation report. (Registration 3328) Mar 1946. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The stereoplanigraph manufactured by Zeiss-Aerotopograph is an instrument used for plotting topographic maps from a stereoscopic pair of photographs and also for aero-triangulation of aerial strip photography. This mapping instrument is one of the most elaborate and universal ever constructed and ever used to any extent. There is a photograph of the equipment.

PB 20091. WIBORN, L. and others. German photographic film base industry. (BIOS Final Rept 262, Item 9). n.d. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
The report records the findings of an examination of the technique of photographic film base manufacture in Germany. Since Kodak A.G., Agfa (Wolfen), Agfa (Landsberg), Deutsche Celluloid Fabrik (Hilenberg), Schering-Kahlbaum, Zeiss-Ikon, Koebig, Knobold and Krupp-Berndorf were all in the Russian zone the targets available were hardly representative of the highest standards attained in the industry. Most of the film output appears to have employed a film base of nitrocellulose or secondary cellulose acetate. The acetate manufacturing plants of I. G. Dormagen and Wacker, Burghausen provided between them the bulk of the raw material for safety film but their processes differed at almost every stage. Dormagen claimed that their acetate was of better color, clarity and stability. The evidence for a high standard of photographic cleanliness seemed stronger for Dormagen acetate than for Wacker and in the Dormagen process the acetate was better protected at all stages (including final packing) against accidental contamination. The chief point of interest is the study of film coating machines. Schleussner machines made use of solid nickel bands; Agfa used copper bands. The emulsion-coating machine of Perutz, Munich was examined and found to be of a well-known pattern. The Schleussner coating machine, though unusual, did not use any fundamentally new principles. In general it appeared that reliance for maintaining the quality of the product rested more on highly skilled supervision than on elaborate plant designs. Report includes detailed outline of acetylation process at Wacker and Dormagen plants. Translations of specification for nickel bands and of a description of an electrical method of measuring the thickness of copper bands are presented. Manufacturing formulae for emulsions, stabilizers and dye are given in Appendix C (in German). Drawings, diagrams, photographs and graphs are included.

United States

PB 23032. HAHN, HAROLD, F. Report on fusion density sun-scanning goggles. (Bur of Medicine and Surgery Res Project X-319) Mar 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this report from the Naval Medical Research Institute, Bethesda, Maryland, was to evaluate the fusion density goggle devised by Dr. Miles for sun-scanning, and to compare it with the variable density goggle, and with no goggle. The preferences of 23 subjects favored slightly the fusion density goggle over the variable density goggle for sun-scanning. Most of the subjects preferred using one or the other goggle rather than no goggle at all, but there were some exceptions. The advantages and disadvantages of the fusion density principle are discussed. This or any dark lensed, enclosed goggle, tends to defeat its purpose by bringing about a certain degree of dark adaptation which is to some extent avoided by open spectacles. It is suggested that the adaptation of Polaroid aviation goggle No. 1067 to the fusion density principle might have certain advantages, since dark adaptation would be reduced, and since the dark lenses need only be used when desired. Another sun-scanning device for limited use is described.

PB 24899. HOOVER, C. R. Aerial photographic flash powders (AC-29, Item 8). Progress report, Oct 15, 1941. (OSRD Rept 171) Nov 1941. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This report discusses the results of the quantitative determination of the light intensity and distribution of 61 different flash compositions selected by qualitative tests from a larger number of compositions prepared from 15 oxidising agents and seven metals. Some improvements in the rate of reaction of the standard Army flash powder can be brought about by increasing the proportion and changing the nature of the oxidising agent. The peak intensity and the total light output can be improved by increasing the proportion of metals but not without increasing the reaction time. Some increase in both speed and intensity may be secured by small changes in the proportions of components and the introduction of small amounts of other materials such as zirconium and thorium metals or compounds. Experimental evidence is presented which indicates that 20 gram lots of flash powder radiate a much larger amount of light per unit of weight than has been reported by other investigators for the unit weight output of the standard 25 pound Army flash bomb. The difference are of the order of 5 to 1, and indicate that better distribution of the flash offers important possibilities. Some progress has been made in producing better distribution by synchronizing several small flashes and by spreading the flash through use of specially designed containers, or small charges of explosives. It is suggested that the simple expedient of increasing the time of exposure now employed in the standard aerial camera would improve negative film densities which are now critically low when night photographs are taken with present equipment at a distance of more than 5,000 feet from the ground. It is also suggested that the design and construction of a special night aerial camera with a smaller f number than is at present used would improve results.

PB 25066. KING, HARRY G. and BIRREN, JAMES E. Laboratory test of anti-glare spectacles. Final report. (Bur of Medicine and Surgery Project X-172, Rept 1) Jun 1943. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

Over 2400 searches for submerged targets were conducted in the laboratory of the U. S. Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md., with and without anti-glare spectacles under simulated field conditions. Results indicate clearly that polaroid spectacles do not increase an observer's ability to sight a submerged target. Use of the spectacles reduced the percent of successful searches by a small, but probably a statistically significant percentage. The majority of the observers, unaware of their score, concluded that the anti-glare spectacles were of benefit in sighting the target. The observer's attitude toward the use of spectacles was undoubtedly influenced by reduction of glare which defined targets, visible with and without glasses, more sharply. In general, success in the searches increased with increasing altitudes of the observer up to 5000 feet (maximum altitude tested) both with and without spectacles at various sun angles and bearings from the sun.

PB 23168. KING, PETER and LOCKHART, LUTHER B. Experimental and theoretical results in two layer low reflecting coatings for glass. n. d. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
A method for calculating the case of n layers of reflecting coatings for optical surfaces has been in use for some time at the Naval Research Laboratory. This general method has been applied to the present case of two transparent layers with the light at normal incidence. The relationship between the indices of the two layers and the glass for quarter wave films is presented in this report to show the tolerances allowable in the thicknesses of the two layers used for coating the optical surfaces. Curves are also presented to show the agreement with theory of actual spectral curves of coatings with different thickness layers and different indices. The index of the particular material used was determined by coating glass of known index with a quarter wave film of the material, obtaining the spectral curve with a General Electric Recording Spectrophotometer and calculating the index from the maximum or minimum reflection value, using the relation $R = \left[(n_1 - n_2^2)/(n_1 + n_2^2)\right]^2$ where n_1 = index of glass, n_2 = index of coating.

PB 23045. SHILLING, C. W. A report on sample binocular serial #6268, Mark I, model 2. (Bur of Medicine and Surgery Project X-156) Jul 1943. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The results of three different experiments made at the Medical Research Laboratory, U. S. Submarine Base, New London, Connecticut, lead to the following conclusions: (a) No significant differences were found between the performance of men using the sample rigid binoculars manufactured by the Optical & Film Supply Company, and the standard adjustable 7 x 50 binoculars under similar conditions. This conclusion is true not only of men whose focus and IPD approximated those built into the rigid binoculars, but also of those whose focal adjustments were divergent from those of the binoculars. There is evident a poorer performance on the part of men with IPD's markedly divergent from that for which the rigid binocular is set. (b) The sample interpupillary distance setting gauge has been found to be a simple and effective method of maintaining IPD setting in proper adjustment. Its use is recommended. (c) The focus and IPD adjustments which the average enlisted man makes for his eyes are highly variable and are not to be relied upon. Tables and graphs are included.

PB 23479. U. S. WAR DEPARTMENT. Identification equipment FB-385. (Tech Manual 11-403) May 12, 1943. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
The identification equipment described in this manual is designed for rapid production of personnel identification records in the field. The equipment contains camera and all equipment necessary for processing films. It also contains equipment for fingerprinting. The manual contains instructions for assembling equipment, making the photographs, and the fingerprints, and for maintaining the equipment. Drawings, diagrams, and photographs illustrate the text. There is a list of replaceable parts.

PB 22245. U. S. WAR DEPARTMENT. Identification set AN/TPQ-1. (Tech Manual 11-2340) May 30, 1945. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
This identification set consists of a prefocused camera and a stand with all the necessary accessories for making head and shoulder pictures on standard, double-perforated, 35-mm film. The complete set supplies all the equipment necessary to take, develop, print, and enlarge the pictures. The manual contains material for operating, maintaining and repairing the equipment. The usual check lists, trouble charts, and maintenance parts lists appear in the manual. Photographs and diagrams illustrate the text.

PB 23423. U. S. WAR DEPARTMENT. Projector equipment PE-398-A (Tech Manual 11-406-A) Feb. 14, 1944. 130 p. Available from the Supt Docs, Washington 25, D. C. 30¢
This technical manual presents general description and operation instructions for the U. S. Army Signal Corps projector equipment PE-398-A for sound motion pictures from 16 mm. film. This equipment was designed for education purposes and has sufficient illumination and sound volume for any ordinary classroom or for auditoriums of moderate size. List of components, technical data, physical specifications, methods of installation and operation, functioning of parts, and servicing and repair are included in this manual. Appendix contains tabular lists of replaceable parts, table of standard nuts, bolts, screws and washers, list of manufacturers and assembly drawings. Photographs are included.

RUBBER AND RUBBER PRODUCTS

German

PB 16151. BARBERA, R. T. Synthetic rubber plant, Schkopau (near Merseberg), MR-D-975152. (AAF ATI Rept P-25) Jun 1945. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
Report of a visit to one of the first plants erected for the quantity production of synthetic rubber and allied products, which achieved production capacity in 1939. The technical documents secured consist of records, experimental data and production information resulting from operation. Appendix I is a list of cases of these documents, Appendix II, a production schedule proposal for immediate initiation, Appendix III, an itemized listing of the contents of each case of documents.

PB 16364. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von kunststoffen. (Method for the production of synthetic materials). (Enlargement print of part of microfilm 182-6) Mar 1933-May 1935. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
Polymerization of 1-chloro-1,3-butadiene in the absence of oxygen or in the presence of small amounts leads to extensible and elastic masses. In liquid form, as pastes or emulsions, they can be used for impregnating, coating, caulking, and cementing; in solid form they can be used for the production of tires, conveyor belts, hose, oil resistant caulking materials, and similar technical rubber goods. This correspondence concerns German patent 608681 and the preparation of polymers of β chloroprene. In German.

PB 16363. I. G. FARBENINDUSTRIE. Weichmungamittel für chlorkautschuk. (Plasticizer for chlorinated rubber). (Enlargement print of part of microfilm 182-5) Nov 1933-May 1935. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
Use of high molecular weight polymers of isobutylene removes the rigidity or brittleness of chlorinated rubber. The new products are in most cases resistant to water, acids, alkalies, oxygen, chlorine, sulphur dioxide, and other oxygen and sulfur containing chemicals. If necessary, fillers, pigments, resins, drying oils, etc. might be added. They can be applied as paints, coatings, varnishes, films, cements, etc. This correspondence concerns certain German and U. S. patents. In German.

PB 19857. TOUKER, M. A. and COPELAND, N. A.
German neoprene, Vols. I-III. (FIAT Final Rept 719)
Jan 1946. 374 p. Price: Microfilm-$4.00 - Photostat-$25.00

This typewritten report in English mainly describes production at HÖchst of monovinyl acetylene (MVA), its chlorination to form 2-chloro-1,3-butadiene (chloroprene or CD) and the polymerization of CD to form neoprene. Chloroprene and neoprene were considered by some German investigation to be superior in some respects to Buna. However, plant rivalries and Buna commitments limited neoprene production to pilot plant size and development. Flow sheets show the various steps in the production of MVA from acetylene and the chlorination of MVA to form CD. In the chlorination process only about 20% MVA used was chlorinated in one pass, so as to limit formation of byproducts. A high boiling oil was removed as soon as it formed since it helped convert CD to dichlorobutylene. The gases were also treated to obtain additional CD. A formula for the polymerization at HÖchst is given and the polymerization process described. In general Elmo pumps were used for handling acetylene or MVA. Doctor Wollthan at Hüls described some work done at Oppau and said that Oppau was primarily concerned with the synthesis of MVA as a basis for aliphatic chemicals and butadiene. Two plants at Zlin, in Moravia which had been taken over by the Germans were visited. These produced about 60 tons of chloroprene per month but had capacity for only 30 tons of the polymer. A batchwise, emulsion polymerization process was used. No details were obtained regarding the polymerization but samples of chloroprene and neoprene were found either more pure or better than that produced by HÖchst. Not much work was done in Germany on stabilizers for neoprene. Experiments to produce good copolymers with chloroprene were not successful. Neoprene though was found to "weld" very well and was recommended for tire carcasses. Germans impregnated paper to make a good synthetic leather substitute. Curing bags for rubber tires made of neoprene lasted twice as long as natural rubber curing bags. Neoprene was also used for gaskets, packing, the cementing of rubbers, for coating metals, textile fibers and textile coating. Bibliography. Exhibit A and B, with their components are listed next. 1. Work on "Nova" (monovinyl acetylene), by Dr. H. Jockusch. This report discusses: The problems encountered in the preparation of MVA; experiments to improve the yield; investigation of byproduct formation; formation of copper acetylide and means of preventing it; investigation of the reaction mechanism. 2. Memorandum on the status of work on production of vinyl acetylene, chloroprene, butadiene and vinyl methyl ketone, by Dr. Roth, Mar. 1936. 3. Preparation of monovinyl acetylene by Dr. van Zuetphen, Oct. 1938. The method of Nieuland and du Pont of condensing acetylene in slightly acidic cuprous chloride is described. The condition for the continuous method of preparing MVA or MVA with some DVA (divinyl acetylene) are also mentioned. The chlorination of MVA and the subsequent polymerization to form neoprene are also described. 4. No document by this number. 5. Work on the production of chloroprene and on chloroprene peroxide, by Dr. Jockusch, May 1944. The author describes the experience with chloroprene production, and the work on stabilization of chloroprene. A table shows the action of the unstabilized chloroprene with metals. The purification of the chloroprene is described. Chloroprene and oxygen form a peroxide which acts as a fine accelerator for the polymerization process. 6. Status of the chloroprene process, by Dr. Eggert, May 1937. The report contains the following sections: Experiments to improve catalyst performance; experiments with anhydrous fused catalysts; experiments to use reactor gas for chloroprene manufacture. Diagram of the apparatus is included. Travel report by Dr. Müller and Dr. Fuchs to the Bata plant near Zlin, May 1944. Report is concerned with the production of calcium carbide, HCl, MVA and chloroprene. The plant installations and the plant efficiency are described. Also included is a report by Dr. Jockusch, dated Nov 1945, regarding the production of MVA and chloroprene at Zlin. 8. Flow sheet of 5 ton/month chloroprene plant, including MVA, with equipment list, by Dr. Jockusch, Aug 1941. 9. Piping and equipment diagram for 10 ton/month chloroprene plant, with equipment list. Prepared by HÖchst Engineering Dept., Oct 1943. 10. Two large prints showing layout of 10 ton MVA and CD plants. 11. Notes on Erivan chloroprene plant, by Dr. Jockusch, Nov 1941. The manufacture of chloroprene in Russia is described. The reaction, catalysis, distillation polymerization and purification are considered. Also included in Exhibit A are reports(in English) dated Nov. 1945, apparently by Dr. Jockusch on fabrication of chloroprene and MVA. There are also some miscellaneous drawings. Exhibit B. 1. Report on the emulsion polymerization of chloroprene, by Dr. Seydel, May 1944. This report describes the most recent concepts concerning neoprene. Tables compare neoprene with natural rubber and Buna S. Other tables list properties of neoprene. A discussion of neoprene is included in the report. 2. Letter to Dr. Ambros, Dec. 1943, regarding Zlin chloroprene. It is suggested that since this plant's neoprene was of poor quality, it should turn its attention to MV-Emulsion or Buna S. 3. Summary of neoprene, Buna and natural rubber compounding formulas as HÖchst. Ten formulas are given. 4. Summary of the use of neoprene latex for artificial leather, etc. Dr. Müller, Mar. 1945. Tests were conducted with chloroprene stabilized with magnesium oxide base (also containing zinc oxide). Neoprene made of chloroprene thus stabilized was tested for use as synthetic leather. 5. Discussion of tire bag tests, discussion taking place at the Continental in Hannover, Dr. Schulz, Feb. 1945. Neoprene is considered as a very good substitute for Buna for use for curing bags for rubber tires. Mention is made of the contradictory opinion of the Leverkusen plant that neoprene was unsuitable for that purpose. 6. An investigation of the weldability of various rubber-like materials (neoprene, etc.), J. Sarring, Jan. 1945. A comparison is made of natural rubber, Perbunan, Buna S-3, and neoprene, with or without carbon black, and of their use for rubber tires. Tables show the value of each material with mixtures of the others. 7. Discussion on neoprene, Dr. Schulz, Feb. 1945. Neoprene is compared with Buna rubber for curing bags for tires, for rubber tires and other uses. Ways are mentioned to overcome the apparent brittleness of neoprene after heat treatment. 8. Report on the reaction mechanism of the polymerization of chloroprene, Dr. F. Patat, Feb. 1945. The effect of temperature on the linkage, speed of polymerization, and the physical properties is considered. Tables show the physical properties of the polymers, according to whether they are prepared with or without emulsion, and of the emulsion polymers prepared at 30°C and 50°C. 9. Supplement to the following report (10) of Dr. Gunderman and Reuter on the solution polymerization of chloroprene, Dr. Gunderman Feb. 1941. The influence of various chemicals on the polymerization is further considered. Tables show the test results. Two graphs of the results and a diagram of a control viscosometer are included. 10. Report on the solution polymerization of chloroprene, Dr. Gunderman and Reuter, May 1940. The effects of the following upon the polymerization of chloroprene are noted: Temperature, preliminary heat treatment of the monomer, catalysts, certain additives, etc. A kinetic study of the effect of oxygen upon the polymerization is also made. 11. Status of chloroprene work. J. Sarring, Aug. 1942. Neoprene is considered most like natural rubber regarding its physical properties. The physical properties of neoprene are compared with NK, Buna, Perbunan, thiokol and American neoprene. The status of the work on neoprene at HÖchst is also considered. Bar graphs of these substances are included, concerning certain of their physical properties. 12. Note on the use of chlorinated neoprene, Dr. Hendschel, Aug. 1942. A comparison is made of Pergut (chlorinated natural rubber) with chlorinated neoprene regarding physical properties and cost. 13. Trend of neoprene development. Dr. Henschel, Aug 1942. Neoprene is indicated for tires, chlorine and nitric acid-resistant linings, textiles, cements and other uses. 14. Discussion of chloroprene coming from Bata and status of artificial leather, Dr. Schulz, Dec. 1943. A table compares the tensile strength, stretch, tearing and resistance to cold of various substances, including neoprene latex, Acronal, impregnated paper, and natural rubber. 15. Application of neoprene latex to textiles, Dr. Schulz, Jan. 1944. This report reviews the present method of the treatment of fiber to manufacture cloth. Various synthetic used in the textile industry are mentioned. It was hoped that a good method of using neoprene in a fiber felting process would be found. 16. Fractionation and emulsion polymerization of chloroprene from Bata - Zlin, Dr. Seydel, Apr. 1944. The various fractions of Bata neoprene are compared, regarding some of their physical properties, such as tensile strength, stretch, hardness, etc. 17. Testing of neoprene latices, Dr. Spiecker, May 1944. This report describes the preparation of the test sample of the synthetic as a pre-

liminary to actual testing. The samples were to be tested for their value as synthetic leather and for bonding textiles to each other. 18. Summary of conference on neoprene. Dr. Schulz, Jan. 1944. The physical properties of neoprene such as electricity, stability, chemical resistance, vulcanization and other properties are reviewed. Neoprene latex was considered for dipping of articles, leather substitutes, impregnated paper, coatings and bonding for cloth. 19. Summary of work on stabilization of latex against HCl liberation, Dr. Schulz, Oct. 1944. Mention is made of the various stabilizers of the latex and the course of future work. 20. Summary of work on stabilization of latex against HCl liberation. Conference notes by J. Sarring, Oct. 1944. In this discussion, various data are presented regarding the conditions under which HCl would be liberated from neoprene. The theories regarding this liberation and ways to avoid it are discussed. 21. Behavior of neoprene and other rubbers toward solvents, J. Sarring, Jan. 1945. The action of certain common solvents such as water, glycol, acetone, gasoline, benzene and others upon Buna S-3, neoprene, Perbunan, and natural rubber are noted. Standard mixtures of the four rubbers are also tested. 22. Stabilization of neoprene latices for use in artificial leather, Dr. Spiecker, Jan. 1945. Neoprene, when used for artificial leather, was damaged by the liberation of HCl. Various latices and stabilizers were tested to check this condition. It is suggested that a stabilizer might be found which could be used with a good HCl acceptor such as phenoxypropenoxide. 23. Chlorine conference summary. Dr. Fuchs, Jan 1945. Some aspects of monomeric, dimeric and polymeric chloroprene are discussed, including the differences between the chloroprene of Bata and Höchst. Other problems regarding neoprene are: Uses of neoprene; quality; liberation of HCl; the preparation and testing of the VT-1 Emulsion. Miscellaneous sheet (no reference number). German (Höchst) neoprene is compared with American neoprene types G and GN. The Höchst neoprene was considered superior to the American neoprene for use in tires. The use of neoprene latex as impregnating material for synthetic leather is very briefly noted.

Japanese

PB 22536. CHOLLAR, R. G. and others. Examination of enemy materiel (CD-113) (AC-77); Examination of diaphragm and gasket from Japanese aircraft fuel pump. Progress report 116, Aug 22, 1944. (OSRD Rept 4180; War Metallurgy Committee Rept M-378). Sep 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

The diaphragm and gasket consisted of a 71 x 71 fabric of nylon or similar polyamide, coated, but not deeply impregnated, with a synthetic rubber similar to Buna-N. The synthetic material has excellent adhesion to the fabric, and is superior to neoprene in resistance to swelling and tenderizing in contact with aircraft fuels. This is the first reported use of the nylon-type polymer by the Japanese. The synthetic rubber compound probably was obtained from German sources. Table and graphs are included. This is a progress report from the Battelle Memorial Institute.

STONE, CLAY, AND GLASS PRODUCTS

PB 25658. BANCHWERTS, P. V. and WILSON, J. N. The German activated bleaching earth industry, with some observations on German bentonite and Neuburg chalk. (BIOS Final Rept 398, Item 21) Dec 1945. 23 p. Price: Microfilm-$1.00 - Photostat-$2.00

Part I reports on an investigation of activated bleaching earth manufacture by Süd-Chemie A. G., Munich, which is really an amalgamation of three older concerns; the firms remaining outside Süd-Chemie in the trade being relatively unimportant. Of the three bleaching earth factories, Deggendorf was destroyed by bombing, Heufeld was idle from 1942 and Moosburg was in good order and producing. The one grade of bleaching earth produced "Tonsil Standard" consisted of 21% Al_2O_3, 2-3% Fe_2O_3, 58-60% SiO_2, 0.8% chlorides (calculated as HCl), and 3-6% moisture. The appendix includes plans of the plants, a map showing sites of mines, a summary of plants and factories, and a report on samples of clay brought from Germany. Part II is a brief report on production of artificial bentonite by Süd-Chemie and mentions a patent by the Greisenheimer Kaolinwerke. Part III is a report on the Neuberg chalk industry, especially with respect to the firm A. G. für Neuberger Kieselweiss, located at Neuberg on the Danube.

PB 23627. NITEL, W. and KOEPPEN, NINA. Microscopic investigation of reactions between steel slags and cement bound moulds. (FIAT Final Rept 783) Mar 1946. 22 p. Price: Microfilm - 50¢ - Photostat - $2.00

At the Randupson Co. Works, Marseille, France, the optimum quantities of a good cement - sand mould were determined. A brief presentation of the Randupson cement-sand molding process is given in this report and the phenomenon of burning of the sand to the casting is discussed. Microscopic examination of the steel and the mold was made and twenty one microphotographs are included. Report also contains a drawings showing piston and two drawings of hammer saddles with emulsion zones indicated. W. Nitel, the author of this report, was director of the Kaiser Wilhelm Institute for Silicate Research.

PB 23102. FINKEL, R. A. Manufacture of porous stones used in Walter hydrogen peroxide catalyst, M.P. 14. (U. S. Naval Tech Mission in Europe Tech Rept 463-45) Sep 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

The German Walter (M.P. 14) catalyst for contact decomposition of 80-85% hydrogen peroxide consists of a highly porous porcelain stone impregnated with catalyst compounds. The stones or catalyst carrier must combine a high specific area with physical strength necessary to prevent crumbling under service conditions. The stones were developed by the F. Thomas Porsellan-Fabrik, of Marktredwitz near Bayreuth, a branch of Rosenthal Prosellan A.G. This report covers the preparation of this porous porcelain catalyst carrier, including the basic preparation of the porcelain slip, and the special process developed to give the desired porosity.

PB 23812. GREEN, H. N. and others. German glass manufacture as applied to illumination, with particular reference to aviation lighting. (BIOS Final Rept 317, Item 9,31) Oct 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00

The German glass industry was able to carry on during the war period without serious difficulty on the score of raw materials or of manpower. The major raw materials are all home-produced, but in the case of boric oxide, a most important constituent of heat resisting and chemical glassware, and to a less extent of some optical glasses, there was an apparent difference of opinion. Dr. Maurach, Secretary of the German Society of Glass Technology, said that it was not available, and chemical glassware had to be made of an inferior quality without it, while the production of heat resisting glass and the amount of boric oxide in it had to be reduced to a minimum. On the other hand, Hans Leonard, Director of the Sendlinger Optische Glaswerke, said that he had all the borax he needed for the optical and heat resisting glasses made during the war period. This borax (and boric acid) were imported from South East Europe and Turkey, whereas, normally it was imported from America. No developments of a fundamental character had occurred during the war period, either in the product or in the method of manufacture. There were, however, a few details found in the Dr. Genthe & Company factory at Goslar, which is associated with Weule on the manufacture of lighthouse and similar highclass glassware, that were new to the visitors. A description is given of the manufacture of cylindrical drum lenses. In the Weule factory there was a battery of half a dozen new machines for polishing the sections of lighthouse lens rings. In the general illumination field, developments in Germany have been retarded by the war. At Sendlinger a new glass was found that was said to have been prepared for A.E.G. for a new form of runway marker light. A pure green glass for colored lights used on and about airfields was found. Reports of visits to the following are given: Dr. Genthe's Works, Goslar; Oberhausen Glasfabrik, Funke and Berker, Ruhr; Gerresheimer Glashütten-Werke, Fred Heye,

Düsseldorf; Deutsches Spiegelglas, Grünenplan and Mitterteich; Sendlinger Optische Glaswerke, Zehlendorf, Berlin; Dr. Ing. Schneider & Co., Frankfurt; Hartmann & Braun, Frankfurt; G. Schanzenbach, Frankfurt; Robert Bosch, Stuttgart; Kosmos, Stuttgart; W. Weule, Goslar; Zeiss Ikon, Berlin; Askania Werke, Berlin. Interrogations of Dr. Ing. H. Mauraoh, Secretary of the German Society of Glass Technology, and of Dr. F. Born, Osram G.m.b.H., Berlin, are included. The appendix contains proposed and actual itineraries, listing names and addresses of the different types of glass works, lighting firms and institutes.

STRUCTURAL ENGINEERING

PB 25638, PB 25639 and PB 27779. = COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE. German underground installations. Part I: Unique design and construction methods (JIOA Rept 1) PB 25638. 1945. 384 p. Price: Microfilm - $6.00 - Photostat - $26.00. Part II: Adaptations of existing facilities (JIOA Rept 2) PB 25639. 1945. 70 p. Price: Microfilm - $2.00 - Photostat - $5.00. Part III: Various installations of general interest (JIOA Rept 3) PB 27779. 1945. 211 p. Price: Microfilm - $5.00 - Photostat - $15.00

The purpose of Part I (PB 25638) is to discuss the unique design and construction methods used by Germany in building large underground factories. Only nine factories of the several hundred underground installations investigated were found to include design and construction methods that were either new, unique or outstanding. Construction on most of these nine factories started about March 1944, but none were 100 percent complete by May 1945. The St. Georgen and Mains-Weisenau factories were about 80 percent complete. The most unique construction was that of the four semi-underground Messerschmitt Factories near Munich, and Section I has been used to describe that construction. The oil-distillation factory and the tank-part factory at Ebensee are described in detail in Section II. The salient features of each of the six remaining factories are described in Section III. The most noteworthy of these six factories are the Messerschmitt Plant at St. Georgen, Austria, and the Misburgh Oil Refinery at Minden, Germany. The Messerschmitt Plant, one of the most complete and modern underground factories, was almost completed in 13 months, and had produced 987 jet-propelled planes. The Misburgh Oil Refinery, the only complete oil refinery found underground, was not yet in production. Part II (PB 25639) is accompanied by a chart consisting of a compilation of information obtained from visits to various underground facilities such as caves, beer cellars, mines, quarries, etc., that had been utilized by German industry and the German army. Although the list does not contain all such facilities, it is believed to be a representative sample of all such installations. Brief histories are given of the installations listed on the chart. Part III (PB 27779) covers several fields not reported in the other parts and contains a general description, including construction, ventilation, utilities and camouflage, for installations under the following headings: Headquarters and residences, power plants, shelters, munitions plants, oil depots, tunnels, communications centers and fortifications. Included in these descriptions of installations are: Berchtesgaden, Krupp Munitions Plant and Teinerstrasse Hospital. Appendices to all three parts contain lists of drawings filed with the Office of the Chief of Engineers, Washington, D.C. and layouts, some of which will not reproduce well as the copies included here are not clear. Appendices to Parts I and III also contain photographs and maps, and construction costs (Part I). (See also PB 25640, Explosive tests on salt mines utilized for underground ammunition storage.)

PB 25640. MEIDLING, GEORGE A. Explosive tests on salt mines utilized for underground ammunition storage. (JIOA Rept 38) May 1946. 169 p. Price: Microfilm-$4.00 - Photostat-$12.00

This report very briefly outlines the extent of German research and experimentation on salt mines prior to issuance of safety and health specifications for their use as ammunition storage depots. For engineering studies of German facilities see reports entitled "German underground installations" with sub-headings "Unique designs and construction methods" (PB 25638), "Adaptations of existing facilities" (PB 25639), and "Installations of general interest". Attached to this report are six exhibits obtained from the office of the Oberbergamt at Clausthal, Zellerfeld. It is the opinion of the writer of the report that any research in the United States on the detonation of explosives underground has been restricted to small charges of black powder and dynamite such as normal amounts of explosives encountered with working parties engaged in mining operations. Such tests have been conducted by the Bureau of Mines of the Interior Department. However, the attached German reports detonate 5 ton charges, calculate pressures developed and safety distances necessary between charges in an attempt to adapt existing salt mines to large underground ammunition depots for the Army. These exhibits are still in the original German, and comprise the following: "A" - Contains a list of the organization and individuals concerned in the experiments. It also includes a report on the results of 1100 lb. and 2200 lb. experimental explosions in specially constructed chambers in the Riedel mine. A diagram of the underground site is attached. "B" - An analytical study from the Burbach Company on the chemical constituents of exploded TNT. The results of three 1100 lb. tests are attached. Diagram shows the layout, sizes and spacing of the chambers. "C" - A report on experiments conducted from September 11 to 15, 1936. "D" - This report contains the results of the second and third series of experiments with 1100 lb. charges. Drawings show the sizes of the chambers, their spacing, and the destructive effects of the explosions. "E" - The report of the Technical - Chemical State Institute on two series of tests with 1100 lb. charges. Included are diagrams showing chamber layouts, proposed layouts, and a series of photographs showing the effects of explosions. "F" - The consolidated report of the Technical - Chemical State Institute on all of the tests conducted at the Riedel Works. Included are layout diagrams, pressure chart, and photographs of the effects of the explosions.

PB 23119. SYMONDS, PAUL and VIGNESS, IRVIN. Report on influence of duration of impact on damage to some elastic systems. (Naval Res Lab Rept O-2293) May 1944. 20 p. Price: Microfilm-50¢ - Photostat-$2.00

A mathematical solution is obtained for the deflection and stresses in a cantilever beam, whose base is given a transverse impact of a type approximating that obtained in a drop test or other simplified shock loadings. It is found that the maximum stress, considered as a function of the duration of impact, differs considerably from that of the simple mass-spring system. Appendix I gives a mathematical "Analysis of deflection and stress in a cantilever beam subjected to a drop-test type of transverse impact". Graphs, diagrams and bibliography.

PB 22499. WENNISCH, GEORGE R. German submarine pens in France. (Naval Tech Mission in Europe Tech Rept 104-45) Jun 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00

The object of this visit was to obtain structural and bomb damage information on German submarine pens. The report covers inspection of salient reinforced concrete features of the roof slab and special dock problems of the German submarine pens, located at Brest, France. It gives the general data on design of roof and slabs with photographs and drawings of the installation and bomb damage. It also includes photographs of submarine pens located at Marseille, Le Havre, Boulogne, Bordeaux and Cherbourg.

TEXTILES AND TEXTILE PRODUCTS

German

PB 25592. BATES, EMILE B. German textile dyeing, drying and finishing engineers. (BIOS Final Rept 366, Items 22,31) n.d. 15 p. Price: Microfilm - $1.00 Photostat - $1.00

Reports on the following firms are presented: Lindemann & Schnitzler, Düsseldorf; Carlnies (dyers and finishers), München-Gladbach; Montferts, München-Gladbach; Maschinen-Fabrik Gerber, Krefeld; Franz Müller, München-Gladbach; and Benni Schilde, Herefeld. Diagrams of "Elcit" baling press, a "Gerber" hank dyeing machine, and a diagram of the general principle of the decatising machine manufactured by Lettling and Braun, are included. Examination of the firms revealed nothing of outstanding interest.

PB 3893. FALES, WILLIAM D. and others. Textile education in Germany. 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The primary fields of interest for the investigation covered by this report were a study of the types of textile schools in Germany, their organization and administration, their curricula, teaching methods and research programs. The report consists of a general discussion of the German textile schools, and a rather complete description of the Staatl. Technikum für Textilindustrie at Reutlingen, Württemberg, an outstanding textile educational institution and the only school of the higher level that was not at least partially destroyed during the war. Contents include description of buildings and equipment at Technikum; testing laboratories; personnel; entrance requirements and duration of training; school fees; and types of courses offered.

PB 23433. POURT, LYMAN H. and SMITH, JULIAN F. Viscose research, Vereinigte Glanzstoff A.G., Berlin-Seehof, Teltow (Russian zone). (FIAT Final Rept 340). Oct 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Most of the research promoted by Vereinigte Glanzstoff A.G. was centralized at the Forschungsinstitut Seehof. All of the rayon research was concerned with viscose, and the only research on synthetic fibers was on nylon. The main VG product during the war, tire cord, is discussed and a list of documents microfilmed by FIAT, T-Branch, are included in this report of interrogation of Dr. Klesner.

PB 23637. MEIERHANS, JOSEPH and others. German developments in warp sizing. (QM Textile Series Rept 2) Mar 1946. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This report contains information on German developments in warp sizing collected by the "Textile Team" sent to Germany by the Office of the Quartermaster General in the summer of 1945. The contents include: (1) German developments in sizing of spun rayon and filament rayon warps; (2) "Feikes" system of warp sizing, including the formula for this process and tables showing the results of tests of different sizes; "Sizing with Tylose", a brief article on Tylose warp sizes which are a series of water soluble compounds sold by Kalle & Company, Wiesbaden-Biebrich. Formulas, methods of sizing and photographs of sized and unsized rayon and sizing machines are included; and (4) "Manufacture of Tyloses and other water-soluble cellulose derivatives," which is an extract from a report on German plastics practice by Dr. John DeBell, Mr. Walter H. Gloor, and Mr. William C. Goggin, who were sent as observers into Germany to investigate technical developments in plastics. For the latter report, see PB 12467.

PB 22422. SCHIEFER, HERBERT F. and KROPF, RICHARD T. German sewing thread manufacturer, Gütermann A.G., Gutach. (FIAT Final Rept 312). Oct 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This organization is the largest producer of real silk and spun silk sewing thread in Germany. It produces 60% of all German real and spun silk threads which represent about 3% of the national thread production. The manufacturing processes employed are conventional, and there is no record of scientific or research achievement.

PB 22421. SCHIEFER, HERBERT F. and KROPF, RICHARD T. German sewing thread manufacturer at Zwirnerei Ackermann, A.G., Sontheim. (FIAT Final Rept 306) Oct 1945. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00
This organization manufactured darning and sewing thread from cotton, and during the war from rayon and spun rayon. About 18% of the German thread industry was produced by this company with conventional methods and equipment. No fundamental or applied research work was done.

PB 22414. SCHIEFER, HERBERT F. and KROPF, RICHARD T. Research on textile testing, instruments, methods, standards, and on properties of textile fibers in Germany. (FIAT Final Rept 173) Oct 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
As the result of the tremendous development of the staple rayon industry, the Schopper single fiber tester and the Frenzel-Hahn continuous yarn tester are used extensively in Germany. One of the outstanding developments in the field of textile instrumentation was the magnetic weighing beam used in connection with the Frenzel-Hahn yarn tester to measure the variation in tension of the yarn as it is run through the machine at a given elongation. It was also used to measure the tension in roving during the drafting process. The method of determining an index of wearability of knitted fabrics based on a weighted combination of the results of 10 different physical tests, including dry and wet breaking strength, dry and wet yarn abrasion resistance, and flexing in addition to abrasion resistance of the fabric is considered. The technique developed for partial acetylation of a fiber, dissolving the acetylated layer to permit a study of the swelling and density of the fiber layer by layer, seems unique and useful. Some of the material in this report is summarized in PB 12963, abstracted on Vol. I, p. 964.

PB 22423. SCHIEFER, HERBERT F. and KROPF, RICHARD T. Research personality in textiles of Germany. (FIAT Final Rept 314). Oct 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report presents briefly the outstanding personalities in the textile industry in Germany, namely: Dr. Ing. Bernhard Bisinger, Prof. Dr. Ing. Egon Klöd, Prof. Dr. Ing. Otto Johannsen, Dr. Prof. Dr. Ing. Otto Mecheels, Dipl.-Ing. Wilhelm Meyer, Dr. Ing. Curt Mierisch, Dr. Ing. W. Oeser, Prof. Dr. Hermann Rath, Dr. H. Reinfeld, Dr. Carl Rösch, Prof. Dr. Hermann Staudinger, Frau Dr. M. Staudinger, Dr. Stock, Dipl. Ing. Albert Von Ostermann, Prof. Dr. Ing. F. Walz, and Dr. H. Zahn.

PB 22419. SCHIEFER, HERBERT F. and KROPF, RICHARD T. Sales syndicates of the German sewing thread industry. (FIAT Final Rept 301). Oct 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The sales and distribution of sewing thread in Germany is primarily in the hands of Sales Syndicates, held on a share basis by the various members. Approximately 90% of the sales of the German sewing thread industry is in the hands of the three leading selling syndicates: Leinenzwirnvertrieb, G.m.b.H., Hamburg; Nähgarnvertrieb, G.m.b.H., München; and Seiden und Garn, G.m.b.H., Freiburg. These syndicates, described briefly in this report, control prices, qualities, and volumes.

PB 22412. SMITH, JULIAN F. Documents relating to cottonizing and bleaching bast fibers at I.G. Farbenindustrie Zellstoff-Werke, Griesheim. (FIAT Final Rept 21) Sep 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
The documents referred to are being assembled in portfolios for the use of investigation teams. Their contents are not described. A pilot plant at Griesheim carries out bleaching without tendering in a stoneware tank having a capacity of 200 kg. skein yarn. Samples of goods made up from cottonized flax and hemp include dress and shirt fabrics, tablecloths, napkins, underwear, and short pile velvet. This information was gained from interrogation of Dr. Karte.

PB 22411. SMITH, JULIAN F. Documents relating to duck weaves; adhesion of rubber to fiber; textile finishes, at VAL. Mehler Segeltuchweberei, Fulda. (FIAT Final Rept 18) Sep 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00

interrogation of Dr. Schneider revealed that no new constructions were introduced at the plant during the war. At the time of this report production consisted fo U.S. flags, tire cord, canvas, shirting, and some other fabrics. No information is given as to the documents mentioned in the title except that they had been given previously another investigator.

PB 22428. SMITH, JULIAN F. Publications at I. G. Farben laboratory building, Hoechst. (FIAT Final Rept 346). Oct 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report lists 38 publications (1940-1944) which might prove interesting to the textile industry. It was recommended that the "Mitteilungen" of various textile schools be examined to locate any original material. Cards selected from a collection of I. G. Farben sample cards of military and raincoat fabrics and accompanying directions for dyeing or finishing are filed in Col. Steadman's office together with a classified list. The classes are listed in the report.

PB 22434. SMITH, JULIAN F. Rayon research by Dr. Adolf Riedemann, Parsevalstrasse 22, Wuppertal-Barmen. (FIAT Final Rept 330). Oct 1945. 2 p. Price: Microfilm-50¢ Photostat-$1.00
Formerly with the Rheika laboratory of Phrixwerke A.G., Dr. Riedemann is now uncertain of his status. His main lines of research were antiswelling treatments for viscose rayons, water resistance, and ways of increasing wet strength of rayon.

PB 22429. SMITH, JULIAN F. Recent literature of textiles at I. G. Farben Chemische Fabrik, vormals Weiler ter Meer, at Uerdingen. (FIAT Final Rept 335). Oct 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
The Weiler-ter-Meer Works at Uerdingen made heavy chemicals, inorganic pigments, aniline and a few other dye intermediates, alkyd resins, and some nylon intermediates. Its laboratory records and research are confined to these subjects, but the coverage in its scientific library is broader. Some research trends are noted from papers published in 1943-1944.

PB 22426. SMITH, JULIAN F. Rheydt technical library Höhere Fachschule für Textilindustrie, Webschulstr. (FIAT Final Rept 333) Oct 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Addresses of former faculty members were obtained but no trace of the stored library. A large collection of German textile patents was in the ruins. Four publications recovered from the ruins are listed.

PB 22431. SMITH, JULIAN F. Textile research and education, Höhere Fachschule für Textilindustrie at Aachen. (FIAT Final Rept 332) Oct 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The specialties of the major German textile schools are listed. Aachen granted certificates of "Ingenieur" for completion of its 3-year sequences in spinning, weaving, finishing, designing or sales. Lines of research at the school are recorded in "Erfahrung und Forschung" 1936-1943. Two modern developments in textile machinery are briefly mentioned. One is a Swiss (Sulzer) loom with very small shuttles. The other is a Belgian card which has a speed of 25 meters as against 15 to 18 meters for ordinary cards.

PB 22435. SMITH, JULIAN F. Textile research - textile education, Spinnstoffabrik Zehlendorf, Wupperstr. 3 (on Teltow Kanal). (FIAT Final Rept 343). Oct 1945. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
Interrogation of Mr. Posselt revealed that development work in textile engineering and machine design was limited to minor details of simplification or changes for economy. There was some research in an effort to bring out staple to the spinning operation without losing its parallel orientation of fibers. In textile education the schools are of two kinds, secondary and higher trade schools (mittlere und höhere fachschule). The higher schools grant certificates as engineers; the secondary schools grant certificates.

PB 22427. SMITH, JULIAN F. Thread, sewing, rayon, Zwirnerei - und Nähfadenfabrik Rhenania A.G., Dülken, Rheinland. (FIAT Final Rept 324). Oct 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Rhenania was devoted exclusively to the production of cotton thread, but during the war was forced to use rayon staple. A table presents data as to size and ply of thread for various uses.

PB 22430. SMITH, JULIAN F. Viscose yarn manufacture, Rheinische Kunstseide A. G., Rheika Plant, Uerdingen. (FIAT Final Rept 327) Oct 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The Rheika plant can operate when permitted to by the production control authorities. Its products were filament rayon, rayon staple, and a high tenacity filament yarn (all from viscose). A cone of the high tenacity yarn was obtained as a sample.

PB 22436. WICKER, DANIEL B. and SMITH, JULIAN F. Cellulosic rayons - polymides, Kaiser-Wilhelm Institut für Chemie, Thielallee 63, Berlin-Dahlem. (FIAT Final Rept 342). Oct 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
In collaboration with Kurt Hess, Dr. Max Ulmann has worked on the chemistry and molecular structure of cellulose, almost entirely from the theoretical side. He has done some work with cellit, a cellulose acetate foil. A list of the published reports of Dr. Ulmann and a list of the reports submitted to the Russians which relate to the work of the Kaiser-Wilhelm Institute für Zellwollforschung are included.

PB 22437. WICKER, DANIEL B. and SMITH, JULIAN F. Staple fiber research, Zellwolle- und Kunstseide-Ring (ZKR), Berlin-Zehlendorf. (FIAT Final Rept 345). Oct 1945. 2 p.
ZKR was a Nazi-sponsored sales organization conducting chemical research for rayon staple fiber producers. No details are given. A list of the books published since 1940 found in Dr. Stench's laboratory library is included in this brief report of interrogation of Dr. Stench and Dr. Wenckel.

PB 22434. WICKER, DANIEL B. and SMITH, JULIAN F. Textile Division, Chemisch-Technische Reichsanstalt. (FIAT Final Rept 341) Oct 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The work on textiles in this laboratory was mainly scientific but some technical applications were also studied. Topics included fine single fiber testing, viscometry, accelerated ripening of viscose, wool substitutes and dry spinning. Published and unpublished documents by Dr. Paul Eckert are cited.

Swiss

PB 22420. SCHIEFER, HERBERT F. and KROPF, RICHARD K. Textile research personality, institutions, and researches on textile testing, instruments, methods, standards and on properties of textile fibers in Switzerland. (FIAT Final Rept 306) Oct 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report consists of brief presentations of the following Swiss research personalties: Prof. Dr. A. Frey-Wyssling, Prof. Dr. Ing. E. Honegger, Prof. Dr. L. Ruzicka; the following Swiss organizations: Henry Baer and Company, Manufacturers of technical apparatus and precision instruments for the textile industry, Eidgenössiche Materialprüfungs - und Versuchsanstalt für Industrie, Verein Schweiz. Maschinen Industrieller, and the Swiss Federal Institute of Technology; and the progress of the protein fiber "Eva". A bibliography is included.

United States

PB 23106. ALBERGHINI, T. J. Trousers and jackets, lightweight, special: Test report. (Marine Corps Equipment Bd Project 470). Jan 1946. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00
Tests conducted to compare the Trouser and Jacket, Lightweight, Special with the standard utility trouser and jacket showed that the standard utility uniform was neater in appearance and was more durable than the subject uniform which was considered unsatisfactory of Marine Corps use. Photographs and tables are presented.

PB 23107. FREEMAN, F. R. Winter clothing: Test report. (Marine Corps Equipment Bd Project 319). Oct 1944. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
An analysis of the winter uniform suitable for combat by the Marine Corps Equipment Board indicates that the following items of clothing, standard in the Marine Corps, are suitable as part of the winter combat uniform in temperate climates: Wool undershirt, wool drawers, flannel shirt, winter service trousers, pile-lined trousers, and M1943 field jacket. The rest of Marine Corps winter combat clothing is either deficient or less suitable than items supplied to the Army. A recommended list of items to complete the uniform is given. Monthly maps show zones in which normal winter combat clothing is necessary, and photographs and tables are included.

PB 22995. U. S. MARINE CORPS. EQUIPMENT BOARD. Luminous cloth. (Test Rept 68) May 1943. 1 p. Price: Microfilm - 50¢ - Photostat - $1.00
The subject cloth was tested by the Second Marine Division, the results corresponding to tests made by the Equipment Board. It was found that the use of this luminous cloth for identification of men in squad columns in night operations would likewise identify men to the enemy in jungle warfare; that there is difficulty in getting the cloth to adhere to such surfaces as the rear end of a truck; that luminosity depends upon activation by sunlight; and that the identification value is destroyed if the surface of the cloth becomes muddy or discolored.

TRANSPORTATION EQUIPMENT

AERONAUTICS

PB 22728. U. S. ARMY AIR FORCES. AIR TECHNICAL SERVICE COMMAND. Subject classification of aeronautical literature. (T-2 Translation 487). Aug 1945. 34 p. Price: Microfilm-50¢ - Photostat-$2.00
This subject classification of aeronautical literature is a translation of "Zentrale fuer wissenschaftliches Berichtwesen der Luftfahrtforschung" based on 5th edition, Jan 1944 and card supplements.

Aircraft

German

PB 19908. ARDELMOUR, U. J. Small German pilotless aircraft. (Strategic Air Forces in Europe Tech Intelligence Rept B-2). Jun 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a brief letter report on the recovery of parts of the power unit, and bits and pieces of the control mechanism of a small pilotless aircraft bomb (German). An attached sketch shows dimensions of air intake opening at front of the power unit. (This "aircraft" is apparently the V-1 robot bomb.)

PB 23854. DeVELLIER, HELA H., tr. Description of the ME 163 B-0 construction; edited by Brigitta Kuhn. (AAF AFSC T-2 Translation 508). Jan 1946. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
The Me-163 B is a cantilever, tailless, single-seater jet-propelled, mid-wing monoplane used for high altitude operations by day for home defense. The fuselage consists of prefabricated, equipped sections divided into a forward portion and an aft portion, with screw connections used exclusively. Data on construction and structural components and tables of weights, dimensions, engine, aerodynamics and performance data are given. Photographs, design drawings and diagrams are given in this translation of the German "Baubeschreibung Me 163 B-0".

PB 23851. HALL, H. H. Blohm and Voss 155B fighter. (AAF AFSC T-2 Intelligence Rept 104). Sep 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The BV-155B is a single-seater, single-engined high altitude fighter. It has a maximum speed of 431 mph between 21,000 and 33,000 feet and a ceiling of 56,000 feet. It is armed with two 20-mm. and one 30-mm. guns. It is believed to be based on a former Messerschmitt design which was handed over to Blohm and Voss for development. It had not been assembled and some parts may not have been completed. A description is given of the power plant, wing, flaps, fuselage, tail, undercarriage, engine mounting and equipment. Each of these is shown in photographs.

PB 22303. PELLIEUX, H. C., tr. Description of construction, No. 1603: Dornier night fighter, DO 335 B-6 with 1 DB 603 E, and 1 DB 603 EQ. (AAF AFSC T-2 Translation 448) Jan 1946. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
The Do 335 B-6 is a two-seater night fighter of all-metal construction, especially suited to fight high speed bombers. It has one DB 603 E and one DB 603 EQ engine inside the fuselage, driving directly the tractor propeller in the nose and through the extension shaft, the pusher propeller in the rear. Descriptive data on the airplane, and its power plant and equipment are given in paragraph and tabular form. Drawings and graphs are included. This is a translation of the German report "Baubeschreibung Nr. 1603 Dornier- Nachtjäger Do-335 B-6 mit 1 DB 603 E und 1 DB 603 EQ".

PB 23840. PIPPEL and BARNER. Current and voltage distribution in airplanes with high-frequency oscillations. (AAF AFSC T-2 Translation 511) Feb 1946. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a translation by the Intelligence section at Wright Field, Dayton, Ohio, of the German report "Strom- und Spannungsverteilung auf hochfrequent schwingende Flugzeuge." Forschungsbericht Nr. 915 Flugfunk-Forschungsinstitut Oberpfaffenhofen. It presents a survey of current and voltage distribution at different frequencies of operation in a Ju-52. Following a description of the measuring instruments employed, the report offers a survey of current and voltage distribution and of the fundamental course of the currents in airplanes with high frequency oscillations. It shows the difference between the oscillations in case of excitation of the airplane from a direct coupled exciter and those generated through excitation by a fixed antenna, as well as the change in current and voltage distribution which accompanies a change in the operating wave at the edges preferred by the high frequency current. The magnitude and distribution of the currents in the fuselage and in the wings depend to a high degree on the arrangement of the coupling loop so that the shape and position of the characteristic can thereby be fundamentally affected. The report contains photographs, polar diagrams, drawings, and a series of diagrams showing voltage and current distribution in airplanes with different antennae.

PB 22297. RITZ and HENRICH. Amount of energy needed for de-icing equipment. (AAF AFSC T-2 Translation 461; German Aeronautical Res Rept 1786) Mar 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00

This is a translation of the German report "Energiebedarf für Enteisungsanlagen Deutsche Luftfahrtforschung". Forschungsbericht Nr. 1786. It is report no. 4 of the "Ice Accretion" Experimental Group of the Aerodynamic Laboratory Göttingen E. V. After some introductory remarks concerning the prospects of different possible methods of solution for de-icing equipment, the authors discuss the amount of energy needed for the heat de-icing method. The experiments led to the conclusion that it is necessary, for the complete ice protection of an airplane, to install a temperature regulator of 60,000 WE per hour in connection with a 3 kw generator. Following the text is a page of critical comment by Capt. Myron Tribus of the Intelligence section, Wright Field, Dayton, Ohio. Capt. Tribus points out certain discrepancies in the report. Drawings and graphs are included.

PB 22837. SCHLIESTETT, G. V. Notes on structural design of Junkers airplanes. (Naval Tech Mission in Europe Tech Rept 434-45) Sep 1945. 16 p. Price: Microfilm-$0¢ - Photostat-$2.00
This memorandum transmits a report on interrogation of Junkers' engineering personnel by George C. Martin. No highly significant information was obtained, but considerable data of value on design methods and procedures was secured. Subjects discussed include the following: General airplane design, aerodynamics, structural types of construction, structural design requirements, structural and fatigue testing, flight measurement of accelerations, vibration testing, and flight control systems. A graph is appended showing numbers of times that load factors were encountered in 100 hours of flight in an FW 190 and an ME 109 F.

PB 23560. SCHMID. Tentative description of construction of flying wing 229. (AAF ATSC T-2 Translation 526). Feb 1946. 17 p. Price: Microfilm-$0¢ - Photostat-$2.00
This is a translation of the German report "Vorläufige Baubeschreibung des Nurflügels 229" which describes this all-wing airplane. It has two propulsion units Jumo 004 B, retractable bow landing gears and main landing gear, brake flap, parachute fitted with a brake shock absorber, and an enclosed pilot's cockpit with a cabin roof that may be jettisoned. It was designed as a single-seater pursuit plane but may be used as a combat plane carrying a 2-ton bomb load, or as a reconnaissance plane. A description is given of the essential structural characteristics, including wings, landing gear and controlling surfaces, and of the fuel, control and hydraulic switch systems, and the wiring and connections diagrams. Each of these is illustrated with drawings. This report was translated at Wright Field, Dayton, Ohio.

PB 23014. TARRANT, F. G. and BOOTHMAN. The German aircraft HE.274. (CIOS File XXIX-33, Item 25). 1945. 13 p. Price: Microfilm-$0¢ - Photostat-$1.00
This is a report of a visit to the Farmen Aircraft Factory in Paris for the purpose of inspecting one of the two prototypes of the He-274 which were not yet fully assembled. The He-274 was designed as a high altitude, high speed, long range four-engined bomber. The remotely controlled armament system is described and a list of some of its component parts is given. A description of the principles of the remote control system as worked out from the receiver components is given, with a block circuit diagram for one channel. Photographs of the motor generators, relay, receiver selsyns, and a torque amplifier, and a diagram of the gear ratios on the torque amplifier input unit are included as well as profile drawings of the He-274 airplane.

United States

PB 22736. KELSO, C. D. Desert tests of aircraft tires. (AAF Materiel Command Memo Rept EMG-56-4513). Jun 1943. 10 p. Price: Microfilm-$0¢ - Photostat-$1.00
This report outlines a program for the testing of aircraft tires under desert conditions at the Blythe Army Air Base at Blythe, California, during the summer of 1943. This program was designed to bring out flotation characteristics of tires and to show what makes airplanes manouverable on soft supporting surfaces. Material to be tested and specific tests to be conducted are listed in appendices.

PB 22734. MAHLER, JOSEPH. Trip to N.A.M.U., Johnsville, Pa. (AAF AMC Memo Rept TSEPE-673-113) Apr. 1946. 3 p. Price: Microfilm-$0¢ - Photostat-$1.00
The KGW-1 (Gorgon IIc) pilotless aircraft is designed to be a ship to shore weapon for area bombardment. It has a Canard type airframe with a fuselage length of 18 ft. and a wingspread of 11 ft. 6 inches. The bomb load is 1000 lbs., the propellant is a resojet engine mounted atop the fuselage. Top speed is 400 m.p.h., and the maximum range is 80 miles. Features of this device are briefly described in the report.

PB 22293. REHNSTRANK, GEORGE B., JR. and NORMAN, WAYNE A. Molded glass fiber sandwich fuselage for BT-15 airplane. (AAF ATSC Tech Rept 5159) Nov 1944. 68 p. Price: Microfilm-$1.00 - Photostat-$5.00
A monocoque fuselage of sandwich type construction having laminated glass cloth faces on a balsa wood core was conceived, designed and tested by the Aircraft Laboratory at Wright Field. A newly developed contact resin was used for laminating the glass fibers using a new low pressure fabricating technique. The fuselage was 50% stronger than a metal fuselage and 80% stronger than the wooden one. It was more rigid, showing less deflection under load. It has increased aerodynamic efficiency, showing no signs of buckling up to 180% of ultimate design load. It had better damping capacity and better insulating qualities. A history of this project is presented in which the following are discussed: the development of the laminated plastic material; the determination of its physical properties; the selection of a test component; the design of a structure for the application of the plastic material; the development of a fabricating procedure. Graphs, tables, photographs and design drawings are included.

Instruments

PB 22850. FORBES, T. W. and others. Flying by auditory reference ("Flybar"). (OSRD Rept 5133; NDRC Rept 17.3:169) Jun 1945. 91 p. Price: Microfilm-$1.00 - Photostat-$7.00
A report of research at the Psycho-Acoustic Laboratory on the development of the "Flybar" system of auditory signals by means of which the ears could take over some of the duties of reading flight instruments so that the eye might be otherwise engaged, and so that ocular fatigue might be reduced. The project included the basic indications necessary for ordinary blind flying, and also altitude, airspeed and slip indications for the dive bomber pilot. Seven tests were made of various combinations of sound signals. A comparison of auditory and visual signals for turn, bank and airspeed indications for use with a Link trainer showed a similar course of learning for visual and auditory signals though the students thought that the audio signals were slightly harder. Appendix A gives the development by the Bell Telephone Laboratories of an automatic annunciator for dial readings by the use of magnetic tape with 24 separate channels which run continuously and which can translate a dial indication into its spoken equivalent. Appendix B takes up certain problems in flying by aural indications (Flybar) and gives a summary of the findings and possible future applications of the equipment, in the form of questions and answers. This report is illustrated with photographs, graphs, and circuit diagrams.

PB 19906. HASS, EDWARD C. F-1 automatic pilot in a radio controlled P-39 airplane. (AAF AMC Memo Rept TSEPE-673-109). Mar 1946. 2 p. Price: Microfilm-$0¢ - Photostat-$1.00
The test here briefly described demonstrated that the F-1 automatic pilot is readily adaptable to use in radio controlled aircraft.

PB 19916. LANGHEGHT, L. K. and others. Technical inspection at German airfield near Nordhausen. (Strategic Air Forces in Europe Tech Intelligence Rept K-30). Jun 1945. 2 p. Price: Microfilm-$0¢ - Photostat-$1.00
A special attempt was made to procure information on the operation and construction of automatic pilots of "piggy back" or composite aircraft at this location. A brief description is given of the operation of the "piggy back" combination. Information on the automatic pilot was very incomplete.

PB 22722. WILDER, EMILIA, tr. Trans-Description-(Siemens - Loy,i.e. Löwe)automatic pilot K 12. (AAF ATSC T-2 Translation 447). Oct 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report translated from the German describes the Siemens automatic pilot K 12, which operates with electric directional devices and an electrohydraulic power amplifier. Information is given on function, instruments, power consumption and weights, installation, adjustment, operation, and safety devices. This report contains no illustrations. This is a photostatic copy and may not reproduce well.

Engines and Propellers

German

PB 23655. GIERTER. Calculations on the stability of the intake fan 9-2426 103-027 12. (AAF ATSC T-2 Translation 531) Feb 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of the brief captured German report "Festigkeitsrechnung des Vorsatzläufers 9-2426 103-027 12". The intake fan of the exhaust driven supercharger was tested for stability at an overspeed of 10% and results were plotted. The report includes a table of data on the intake fan and three curves which present test results.

PB 23657. JUNG, R. Report on experiments to determine resistance to flow and loss of heat of the light-metal coolant radiators made by the Metall-Veredlungs- G.m.b.H, Metal Refining Co., Stuttgart. (AAF ATSC T-2 Translation 534) Feb 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of the German report, "Bericht über Versuche zur Bestimmung des Strömungswiderstandes und der Wärmeabgabe von Kühlstoffkühlern aus Leichtmetall der Metall-Veredlungs-G.m.b.H." Luftfahrtforschungsanstalt Hermann Göring, Braunschweig. The cooling system under test is composed of flat tubes arranged in rows. Level ribbed fins of 0.3 mm. thickness are fitted over the tubes and butt-soldered. The test arrangement and procedure is described. Test results in terms of resistance to flow and loss of heat are described and given in tabular form. A drawing and a graph are included.

PB 23736. KUHN, BRIGITTA, tr. Characteristics of engines 14 R-4 and 14 R-5. (AAF ATSC T-2 Translation 454). Jan 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This report presents description of the Gnôme-Rhône 14 R-4 and 14 R-5 which are 14-cylinder, double radial, air-cooled engines. Tabulations of general characteristics, characteristics at the test stand (according to Standard AIR 6101/B.), characteristics in flight, weight of engines and accessories, and data on ignition, fuel feed, lubrication and speeds are appended.

PB 23656. LÖFFLER. Resonance of blade and disc vibrations in the model 109-011 jet engine. (AAF ATSC T-2 Translation 536). Feb 1946. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is a translation of the German report "Resonanz von Schaufel- und Scheibenschwingungen am Strahltriebwerk 109-011." Repeated failures due to bending stress appeared in several blades of the second and third axial stage of the V10 blower on the test stand. Each of the grids, located in front of and behind the second stage also showed 3 points of friction 120° apart. Their shape and dispersion led to the conclusion that fan-like disc vibrations were occurring. Tests established that breaking of the blades was caused by resonance vibrations of disc and blades. Corrective measures suggested are to provide the disc with a sufficiently thick rim to avoid resonance with the blades, and redesign of the blades for greater "taper ratio" between blade thickness at the base and thickness at the tip. Calculations of disc vibrations and calculations regarding the most faborable shape of blades are given. Graphs are included.

PB 22305. RITZ, LUDOLF. Summary of the theory and construction of a rational gas turbine. (AAF ATSC T-2 Translation 472) Jul 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a translation by the Air Documents Research Center of the United States Strategic Air Forces of a paper by Ludolf Ritz of the Institute of Thermodynamics of the Aerodynamical Research Laboratory at Göttingen on the development of heat engines of low fuel consumption. The author describes a gas turbine power plant (Regenerateren-Gasturbo-Triebwerk or RGT) consisting basically of a turbo-compressor, a turbine and a regenerator. He summarizes the advantages of the RGT as a power plant for long range aircraft and discusses the design of the components in an attempt to show that all requirements for long range aircraft are met. A brief comparison is made of a compact self-contained unit which could be replaced as a whole and a divided unit which separates the load turbine from the remainder of the unit, consisting of compressor, heat exchanger, low pressure turbine and reaction jets. The engine may be adapted for tanks, locomotive drives, refrigerating machines and stationary power plants. It can be designed to use liquid or solid fuel and will operate either at ground level or at altitude with economy and high efficiency. Long range aircraft with Otto engines and with RGT's are compared in a table. The report is illustrated with design drawings and graphs.

PB 23644. ROSENBERG, ALFRED, JR. Shielding effect of interference-eliminating flexible tubes; edited by Ludwik Hausknecht. (AAF ATSC T-2 Translation 518) Apr 1946. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This is an AAF translation of the German report "Die Abschirmwirkung von Entstörschläuchen" by the Deutsche Versuchsanstalt für Luftfahrt, E. V., Institut für Elektrophysik. It discusses the use of flexible braided tubing and metal tubing for shielding airplane engine ignition system wiring to prevent radio interference in the frequency range from 10^5 to 10^7 cps. A mathematical method for working out in advance the shielding effect of different casings and connectors is described using coupling resistance as a measure of the degree of shielding. Since the efficiency of the shielding is determined by the weakest part, he recommends threaded type connectors. Tables, graphs, drawings and a bibliography of 6 items are included.

United States

PB 19898. BENNETT, M. A. Cold weather starting tests of an R-2600-7 engine. (AAF Materiel Center Memo Rept ED. M-57-426-150). Sep 1942. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
A report on the progress of cold weather starting tests on an R-2600-7 engine equipped with an Army type priming system and a W.A.C. type priming system. The two priming systems are compared and a chronological account of the tests is given in an appendix. Photographs and drawings are attached.

PB 19897. RODEMULLER, R. Sea Level and altitude calibration test of the Napier Sabre Series 1 engine. (AAF ATSC Mem Rept EXP-M-57-503-480) Nov 1941. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The calibration test for this engine was made on a dynamometer stand at the Army Air Force Power Plant Laboratory from September 23 to October 22, 1941. Pressures, temperatures, fuel flow, air flow and power were measured in accordance with Army-Navy Specification AN-9502. Altitude conditions were simulated by controlling carburetor temperature, carburetor pressure and exhaust back pressure. The engine met the specifications for sea level and low blower altitude ratings but it was decidedly low in altitude in high blower, the deficiency varying from 1,300 to 1,900 feet. A description of the engine and a chronological test log is followed by graphs, comparative tables and photographs of the engine and the testing equipment.

PB 23635. ROYER, R. L. Calibration of an AAF 3-blade adjustable pitch test club, blade design no. X43X10609, hub design no. 30-712, for use on the ranger V-770-3 engine. (AAF ATSC Tech Rept 5392; Whirl Test 1772). Dec 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

The test club propeller consisted of a standard AAF 3-way split hub and 3 wooden blades. The blade shanks were fitted with the AAF ferrules fastened by lag screws. Blade diameter for the first tests was 7 feet 6 inches. The test club, mounted on an electric motor test stand, was calibrated at blade angle settings of 9, 5, 14, 16 and 18 degrees at the 30 inch radius. At the 7 ft. 6 in. diameter, the blades flutter characteristics were such that they would probably have failed at the rated speed and power. To stiffen the blades, the diameter was reduced to 7 feet and recalibrated at blade angle settings of 10, 14, 18, 22, 26 and 30 degrees at the 30 inch radius. At the 7 foot diameter, the test club was recommended for use on the Ranger V-770-3 or other engines of No. 30 shaft size within the ranges of 0 to 525 hp. and from 0 to 2400 propeller r.p.m. This report includes tables and graphs of test results and photographs of the test propeller.

PB 23636. BOYER, R. L. Type test of a Sensenich two-blade spliced maple propeller blade design no. 86R61; Warner hub design 7900 for use with the L-440-1 engine: (AAF ATSC Tech Rept 5391; Whirl Test 1741) Dec 1945. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The two-blade fixed pitch propeller was built of spliced maple laminations glued with a cold setting resin glue. The laminations were spliced with staggered longitudinal joints in order to utilize narrow pieces of wood otherwise useless, and were made of maple. The original propeller was 7 ft.2 in.in diameter, but was cut down to 6 ft.10 in.in order to obtain a higher r.p.m. The propeller was given an electric motor test stand calibration and endurance tests, and overspeed and engine direct drive endurance tests. It is concluded that the propeller is structurally suitable for use with the L-440-1 engine, and that maple wood may be used in place of birch, and that each lamination may be spliced longitudinally. It is recommended that the propeller be given a flight test before it is released for service use and that the production model for use on the L-440-1 engine have a diameter of 6 ft. 10 in. Tables, graphs, and photographs are included.

PB 19895. CORSAW, L. H. and LASSWELL, P. M. Electric motor tests of AAF balsa wood cuffs, design 45M10800 for B-29 airplanes using 24F60-6521A-6 propellers: Whirl test no. 1962. (AAF ATSC Tech Rept 5360) Nov 1945. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
The series of tests covered by this report led to the approval of balsa wood cuffs for B-29 airplane propellers. The cuff design finally selected were tested and successfully completed one hour at speeds above take-off of 980 r.p.m. including 15 minutes at 1580 r.p.m., three minutes at 1720 r.p.m., and three minutes at 1800 r.p.m. Tables and photographs are appended.

PB 19901. HAMELINK, C. D. The economic feasibility of further expanding the products of combustion in aircraft engines to increase engine efficiency. (AAF Materiel Command Memo Rept ENG-57-518-239). Dec 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Curves calculated from data obtained on previous single cylinder tests indicate that higher thermal efficiency may be obtained by performing a further increase in the expansion of the products of combustion without sacrificing the total gain in indicated horsepower to increased friction losses. Six graphs are attached.

PB 19900. HAMELINK, C. D. The variation of friction horsepower with engine displacement. (AAF Materiel Command Memo Rept ENG-57-518-238). Dec 1943. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
Tests were conducted for the purpose of establishing a working relation between friction horsepower and engine displacement. It was concluded that for practical purposes the probable friction horsepower may be predicted on one or both of the following bases: (a) Friction horsepower is proportional to engine displacement at given piston speeds and therefore is a straight line function as the size of the engine increases, and (b) for approximately the same dimensions and conditions of operation as those encountered in present day engines the mechanical efficiencies may be evaluated as follows: (1) For sea level engines mechanical efficiency equals 90%; (2) for medium supercharged engines efficiency equals 87½%; and (3) for higher supercharged engines efficiency equals 85%. Graphs showing test results are attached.

PB 19902. HAWKINS, H. A. R-2600-29 engine power section corrosion test. (AAF ATSC Memo Rept TSEPL-5-503-3039). Nov 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
Residual gases and vapors, present in the front and main crankcases after engine shut-down, cause or accelerate corrosion in the R-2600 BA engine. It is concluded that this rusting can be alleviated by improving the ventilation or breathing characteristics in these sections. Engines serviced with AN-CO4 rust preventive compound in production instead of the regular 1120 specification lubricating oil were protected against rust during the early stages of engine operation when a natural protective varnish had not yet had a chance to form. Service results have indicated that adequate rust prevention is being accomplished and no lubrication troubles have been encountered which may be attributed to the AN-CO4 compound. Appendices describing specific tests and photographs are attached.

PB 23771. O'BRIEN, BRIAN. Preliminary report on the luminosity of airplane engine exhaust plumes and methods for reducing this luminosity. (OSRD Rept 341). May 1941. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This study presents measurements by photography of the luminous plumes of exhaust gas, which have made some planes unsuitable for night fighting, and recommends honeycomb cells in the exhaust stack to deionize the gas, or longer stacks. Both will result in some lowering of power and efficiency in exhaust jets. Rough photometric measurements of the exhaust luminosity a Wright no. 1820-G Cyclone engine from which all but one cylinder had been removed were made, and three different exhaust jets were used. All combinations of stack length, jet area, and mixture ratio were used, giving a total of 18 runs. These are presented graphically and in tabular form in Appendix II. Photographic methods used are discussed in Appendix I. Three photographs are included. The study was made by Brian O'Brien of the Institute of Optics, University of Rochester.

PB 23511. SKITEK, GABRIEL G. Temperature distribution on propeller equipped with de-icing boots. (AAF ATSC Tech Rept 5382; Whirl Test 1881). Nov 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
Temperature measurements were made by means of nickel wire temperature elements on 44 stations along one blade of an 11-foot Curtiss propeller equipped with rubber de-icing boots. This information was needed as a basis for design of metallic heating elements for propellers. Readings were taken at a power density of 3.2 watts per square inch in the heating boot, at propeller speeds of 1000, 1150 and 1300 r.p.m. The longitudinal distribution of heat was found to be poor along the heated leading edge. The leading edge was found to be 30 degrees hotter than the trailing edge. The temperature also varied between the different stations on the leading edge. Test methods and the instrumentation and procedures are given. Photographs, curves, tables and circuit diagrams are included.

PB 23512. VONDERHEID, EARL A. Calibration of two-blade, adjustable pitch test club, blade design no. 42R16016, hub design no. 30-710, for use on an R-985 engine. (AAF Tech Rept 5386; Whirl Test 1884) Nov 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of the test was to determine the proper angle settings for the propellers under any operating condition of the R-985AN-1 engine. Two test propellers, consisting of wood blades assembled in split type steel hubs, were calibrated. One propeller had a varnish finish while the finish of the other was of plastic. Horsepower and thrust calibrations were run for the varnished blade with the 36 inch radius angle set at 5, 7.5, 10, 12.5, 15 and 17 degrees. The plastic blade calibrations were run at angle settings of 3, 5, 7.5, 10, 12.5, 15, 17 and 19 degrees. The test run data are tabulated and curves are given.

Operations

PB 22736. HAPP, H. W. Evaluation of air navigational systems. (AAF ATSC Memo Rept TSEPE-668-215). Feb 1946. 10 p. Price: Microfilm- 50¢ - Photostat-$1.00
The purpose of this memorandum is to report on a conference held at Headquarters, AAF, Washington, D. C., on February 4 to 9, 1946 to evaluate all known and proposed air navigational and air traffic control systems. Personnel present (appendix A) and the program for the conference (appendix B) are listed in the report. A complete report is to be released by the Office of the Deputy Chief of Air Staff for Research and Development.

Maintenance and Repair

PB 22488. LICHTENWALNER, J. Y. A study of German aircraft maintenance and overhaul methods. (Naval Tech Mission in Europe Tech Rept 88-45). May 1945. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a report of a 21-day trip into newly conquered territory in the spring of 1945 to visit airports, factories and other units engaged in the repair, overhaul and maintenance of aircraft or parts. The author reports on the organization of German maintenance forces, layout of airfields and repair establishments, types of buildings, test cells, and equipment. He comments on repair and maintenance unit organization, processes and methods, maintenance publications, and problems of parts supply. He also reports on new equipment or methods meriting further study, and makes individual reports on visits to many plants. Photographs, organization chart, instructions for disposal of damaged aircraft equipment, and a list of equipment and documents secured are appended.

Airports and Airways

PB 26993. KRAFT, A. P. and others. Study of the use of air curtains for fog dissipation. Progress report, Mar 31, 1944. (OSRD Rept 3775) Jun 1944. 61 p. Price: Microfilm-$2.00 - Photostat-$5.00
The original problem assigned was the clearing of radiation fogs upon runways with a wind velocity less than four miles per hour. A research upon the behavior of heated air jets in a 1/25 scale model was initiated. The results of this investigation indicated that the heated air jet would be an economical method of clearing fog under the above conditions although the initial cost of installation would be high. Later, at the request of the Bureau of Aeronautics, the investigation was carried for a higher wind velocity, but here the prognostications are less favorable. With across wind as high as 16 m.p.h. it is doubtful whether fog can be cleared except by the use of prohibitive jet temperatures, and excessive amounts of fuel and brake horsepower. This is a progress report under contract with the University of Illinois. Tables, graphs, photographs and drawings are included.

PB 22836. WELLS, HENRY H., JR. Selfridge Field instrument landing system (CAA-Army type). (AAF ATSC Memo Rept TSELO4-37). Feb 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The Selfridge Field instrument landing system consisted of a CAA localizer with side-band generator modulation, three CAA type TBS markers and one Army AN/CRN-2 glide path transmitter installed on the North-South runway. The equipment was found to be installed but operating below expected efficiency due to (1) lack of trained maintenance personnel (2) complexity of the equipment (3) time consuming supply channels for obtaining replacement parts (4) lack of procurement authority to procure maintenance items which could be bought locally (5) lack of complete instruction literature and (6) lack of periodic inspection systems. A program to remedy these difficulties is recommended.

Aerodynamics

PB 22637. RETZ, ALBERT. Special problems in aerodynamic research. (BIOS Halstead Exploiting Centre Rept 1). 1940. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a translation of a lecture delivered at a science meeting of the German Academy for Aeronautical Research on Mar.15,1940. It outlines the fields of activity in aerodynamic research and comments on the status of research on wind tunnels, ice formation and de-icing of wings, and new propulsion devices. Flow development of the airstream in wind tunnels dependent upon the shape of the entrance, and German testing technique in the investigation of air resistances and forces acting on projectiles are discussed. The development of the arrow wing form for high speed flying, and the effect of the boundary layer on wing profile are commented on. Comments are made by Mr. Bock on moistening of airscrews to protect them against icing and the decrease of profile resistance of airplane by influencing the boundary layer. Mr. Lorenz made a plea for more and better wind tunnels to equal those in the United States, and presented comparative statistics on air research in the U.S.A.,Great Britian, France, Soviet Union, Germany and Japan. A secret report by Mr. Madelung is summarized. It touches mainly on the stability of bombs and dropped mines. Graphs, photographs and drawings are included.

PB 23631. FENG, KWEI L. Schlieren observation in the DVL high speed wind tunnel. (AAF ATSC Memo Rept TSEAC-90311-1-6) Apr 1946. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This paper includes a translation of a report by F. Mirus, Berlin-Adlershof, which was Report no. 127 in the "Lilienthalgesellschaft für Luftfahrtforschung". The principle of the Schlieren method is explained and illustrated with diagrams. A description of the set-up of the Schlieren installation in the DVL high speed wind tunnel is followed by an evaluation of the Schlieren film and its possible application in shock wave photography. With the help of the Schlieren method the strength and distribution of the shock wave as well as the place of origin can be obtained, and especially the point of critical flow about a body can be found. It is a very important means of determining the best types of structures for high speed flight and learning more about the regions of supersonic flow where shock waves are usually formed. Photographs taken by this method are included.

PB 22634. TANK, KURT and RETZ, ALBERT. Aerial research and aircraft construction; new results in influencing the lifting power of wings. (BIOS Halstead Exploiting Centre Rept 4). 1942. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This publication consists of two lectures which were delivered at science sessions of the German Academy for Aeronautical Research in February and May 1942. The first by Kurt Tank traces historically the rapid rise in German aerodynamical research from dependence upon NACA reports to the influence of Prandtl, Betz, Multopp and O. Schrenk on wing design. Studies were developed on stability, rudder power, the influence of wing and tail units on the fuselage and cowling, and problems of wing loads and fuselage design. He calls attention to the need for the development of measuring methods and theoretical and experimental studies on flutter that will predict the approach to critical conditions. The development of propellers and jet propulsion for higher velocity flight are indicated as research projects. The second talk by Albert Betz is a brief report on wing profiles and on methods designed for the sucking off of the boundary layer by slots in the rear wing edge, diagonal slots and a split flap to increase the coefficient of lift. Graphs, tables and small design drawings are included. Some will not reproduce well.

PB 24991. WEISE A. The cardioid curve method for working on compression shocks. (BIOS Halstead Exploiting Centre Rept 607). Dec 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report, translated from the German, describes a new method called the "cardioid curve" method, of solving problems of intersecting shock waves in supersonic flow. This paper is illustrated with diagrams, graphs, and a Schlieren photograph.

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